AFP in the CONTROL-D Environment Implementation Guide

Supporting

CONTROL-D version 6.2.21

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Have the following information available so that Customer Support can begin working on your issue immediately:

- product information

    — product name
    — product version (release number)
    — license number and password (trial or permanent)

- operating system and environment information

    — machine type
    — operating system type, version, and service pack or other maintenance level such as PUT or PTF
    — system hardware configuration
    — serial numbers
    — related software (database, application, and communication) including type, version, and service pack or maintenance level

- sequence of events leading to the issue

- commands and options that you used

- messages received (and the time and date that you received them)

    — product error messages
    — messages from the operating system, such as `file system full`
    — messages from related software

Contents

Figures

Tables

About This Guide

The guide contains the following chapters:

Chapter 1 – Introduction

Gives a management overview and cites relevant AFP publications.

Chapter 2 – The AFP Architecture

Contains information regarding technical issues and external resources in AFP.

Chapter 3 – Categories of AFP Applications

Describes five categories of applications that produce output intended to print on AFP printers.

Chapter 4 – Decollating AFP Output

Describes output decollating and retrieval from the system spool and CDAM compressed sysouts.

Chapter 5 – How to Implement AFP Output by Categories

Describes how CONTROL-D retrieves data and printing characteristics in each of the five output categories.

Chapter 6 – The APAPARM Option

Describes how APAPARM can be used to produce Category 3, Category 4, and Category 5 output.

Chapter 7 – Online Viewing

Describes how AFP reports processed by CONTROL-D can be viewed on-line.

Chapter 8 – The OUTPARM Option

Explains how to override default printing characteristics by using the CONTROL-D OUTPARM option.

Chapter 9 – Printing Reports

Describes how to perform immediate or deferred printing, determine chunk size, and print banner pages.

Chapter 10 – Printing Banners

Describes how to print banners and use the OUTPARM option for banner printing.

Chapter 11 – Marking User Bundles

Describes how to mark user bundles for easy identification and how to print bar codes on banners.

Chapter 12 – Archiving and Restoring AFP Reports

Describes how to archive and restore AFP reports.

Chapter 13 – Disaster Recovery (Backup Site) for Printers

Describes how to prepare a backup site for printing and what to do in case of a disaster.

Chapter 14 – Performance Considerations

Suggests methods for improving the performance of AFP printers.

Chapter 15 – PC/LAN Environment

Describes how CONTROL-D/WebAccess Server can provide mainframe report accessibility to a large pool of PC users in a LAN environment.

Conventions Used in This Guide

Notational conventions that may be used in this guide are explained below.

Standard Keyboard Keys

Keys that appear on the standard keyboard are identified in boldface, for example, **Enter, Shift, Ctrl+S** (a key combination), or **Ctrl S** (a key sequence).

—— WARNING ——————————————————————

The commands, instructions, procedures, and syntax illustrated in this guide presume that the keyboards at your site are mapped in accordance with the EBCDIC character set. Certain special characters are referred to in this documentation, and you must ensure that your keyboard enables you to generate accurate EBCDIC hex codes. This is particularly true on keyboards that have been adapted to show local or national symbols. You should verify that

$ is mapped to x'5B'
# is mapped to x'7B'
@ is mapped to x'7C'

If you have any questions about whether your keyboard is properly mapped, contact your system administrator.

Preconfigured PFKeys

Many commands are preconfigured to specific keys or key combinations. This is particularly true with regard to numbered PF keys, or pairs of numbered PFKeys. For example, the END command is preconfigured to, and indicated as, **PF03/PF15**. To execute the END command, press either the **PF03** key or the **PF15** key.

Instructions to enter commands may include

- only the name of the command, such as, enter the END command
- only the PF keys, such as, press **PF03/PF15**
- or both, such as, press **PF03/PF15,** or enter the END command

Command Lines and Option Fields

Most screens contain a command line, which is primarily used to identify a single field where commands, or options, or both, are to be entered. These fields are usually designated COMMAND, but they are occasionally identified as COMMAND/OPT or COMMAND/OPTION.

Option field headings appear in many screens. These headings sometimes appear in the screen examples as OPTION, or OPT, or O.

Names of Commands, Fields, Files, Functions, Jobs, Libraries, Members, Missions, Options, Parameters, Reports, Subparameters, and Users

The names of commands, fields, functions, jobs, libraries, members, missions, options, parameters, reports, subparameters, users, and most files, are shown in standard UPPERCASE font.

User Entries

In situations where you are instructed to enter characters using the keyboard, the specific characters to be entered are shown in this **UPPERCASE BOLD** text, for example, type **EXITNAME.**

Syntax statements

In syntax, the following additional conventions apply:

- A vertical bar (|) separating items indicates that you must choose one item. In the following example, you would choose *a*, *b*, or *c*:

```
a| b | c
```

- An ellipsis (. . .) indicates that you can repeat the preceding item or items as many times as necessary.

- Square brackets ([ ]) around an item indicate that the item is optional. If square brackets ([ ]) are around a group of items, this indicates that the item is optional, and you may choose to implement any single item in the group. Squae brackets can open ([ ) and close ( ]) on the same line of text, or may begin on one line of text and end, with the choices being stacked, one or more lines later.

- Braces ({ }) around a group of items indicates that the item is mandatory, and you must choose to implement a single item in the group. Braces can open ({) and close (}) on the same line of text, or may begin on one line of text and end, with the choices being stacked, one or more lines later.

Screen Characters

All syntax, operating system terms, and literal examples are presented in this typeface. This includes JCL calls, code examples, control statements, and system messages. Examples of this are:

- calls, such as

```
CALL 'CBLTDLI'
```

- code examples, such as

```
FOR TABLE owner.name USE option, . . . ;
```

■ control statements, such as

```
//PRDSYSIN DD * USERLOAD PRD(2) PRINT
```

■ system messages, both stand-alone, such as You are not logged on to database database_name, **and those embedded in text, such as the message** You are not logged on to database database_name, **are displayed on the screen.**

Variables

Variables are identified with *italic* text. Examples of this are:

■ In syntax or message text, such as
Specify database *database_name*
■ In regular text, such as
replace database *database_name1* with database *database_name2* for the current session
■ In a version number, such as
EXTENDED BUFFER MANAGER for IMS 4.1.*xx*

Special elements

This book includes special elements called *notes* and *warnings*:

─── *NOTE* ─────────────────────────────
Notes provide additional information about the current subject.

─── *WARNING* ─────────────────────────────
Warnings alert you to situations that can cause problems, such as loss of data, if you do not follow instructions carefully.

Related Publications

CONTROL-D Getting Started Guide

Introduction to CONTROL-D concepts and facilities in the framework of a hands-on demonstration.

CONTROL-D Online Viewing Guide

Tutorial guide that demonstrates the features of the Online Viewing facility.

CONTROL-D Planning and Implementation Guide

Practical guide for determining implementation objectives, and for planning and performing the implementation of CONTROL-D.

INCONTROL for z/OS Administrator Guide

Information for system administrators about customizing and maintaining INCONTROL™ products.

INCONTROL for z/OS Installation Guide

Step-by-step guide to installing INCONTROL products using the INCONTROL™ Installation and Customization Engine (ICE) application.

INCONTROL for z/OS Messages Manual

Comprehensive listing and explanation of all INCONTROL and IOA messages and codes.

INCONTROL for z/OS Security Guide

Step-by-step guide to implementing security in INCONTROL products.

INCONTROL for z/OS Utilities Guide

This book describes utilities designed to perform specific administrative tasks that are available to INCONTROL products.

Introduction

This guide helps you to efficiently implement the CONTROL-D built-in AFP support in an AFP environment. The combination of AFP built-in support and CONTROL-D allows you to achieve many AFP advanced functions without modifying application programs. Also, many other CONTROL-D options improve Output Management functions in an AFP environment.

It is assumed that you are familiar with CONTROL-D and Advanced Function Printing (AFP). This guide contains both basic and advanced information, making this document a useful guide for both beginners and advanced AFP users.

Basic CONTROL-D and AFP terms are explained in this guide. Any terms that are not covered in this guide can be referenced in the relevant AFP, CONTROL-D, and IBM publications.

The terminology used in this guide is that of INCONTROL for z/OS version 6.2.*xx* (which includes CONTROL-D version 6.2.*xx*). However, this guide is also applicable to all prior versions of CONTROL-D.

Management Overview

This guide is intended to help CONTROL-D users efficiently implement CONTROL-D in an AFP environment by taking advantage of CONTROL-D's AFP built-in support. The combination of AFP built-in support and CONTROL-D allows you to achieve many AFP advanced functions without modifying application programs. Also, many other CONTROL-D options improve Output Management functions in an AFP environment.

Data centers that use AFP realize the benefits that can be achieved with AFP. Data centers that use CONTROL-D realize the benefits that can be achieved with CONTROL-D. Data centers that use AFP together with CONTROL-D can achieve far more benefits than using each one individually.

Major benefits that can be achieved using CONTROL-D in an AFP environment are:

- Reduced paper costs
- Reduced mainframe printing workload
- Fast AFP implementation and more

CONTROL-D's built-in AFP support includes features such as:

- Full support of AFPDS page mode output (Category 5 output) - for example, DCF documents, GDDM graphics

- Full support for all AFP printers and software

- Support of user-defined overlays for online viewing

- WYSIWYG online viewing of AFPDS page mode reports in the PC environment

- Support of all AFP printing characteristics:

    — Online display and update, even after the production of the report

    — Capability of bundling all reports for a recipient into one bundle for printing, regardless of different AFP printing characteristics

- Enforced standards in printing characteristics

- Advanced banner page marking

- Bar codes in banners

- Automated distributed printing

- Strong disaster recovery support and more

All of the above features, and more, are described in this guide.

Shortly after implementing CONTROL-D in an AFP environment, the significant benefits become evident. Efficient automated output management and major cost savings with minimum effort are guaranteed.

The AFP Architecture

This chapter contains information regarding technical issues in AFP (Advanced Function Printing). The information is essential in order to understand this guide. For a detailed description of all AFP technical issues, please refer to the relevant IBM publications referenced in Chapter 1, "Introduction."

AFP External Resources

There are five AFP external resources. These are:

- Fonts
- PAGEDEFs
- FORMDEFs
- Page Segments (Images)
- Overlays

These resources are stored in system and user libraries. PSF, the AFP printer driver, dynamically manages all the resources required for AFP printing. PSF detects when an output dataset requires an external resource and retrieves the resource from the library as defined in the appropriate DD statement in the PSF procedure.

Each external resource type usually resides in a separate library. It is possible to have a number of libraries for each resource type. In this case, the libraries are concatenated in the appropriate PSF DD statements in the PSF procedure.

A number of methods exist for specifying that an external resource is required, depending on the type of resource.

Methods of assigning external AFP resources are described below.

Fonts

- Fonts can be specified, using the CHARS parameter, in the JCL of the job that produces the output. The CHARS parameter can appear in the DD or OUTPUT statement. When using this method, the following restriction must be considered: The CHARS JCL parameter is limited to four characters, but the font name may be up to six characters (in the case of Typographic Fonts).

- Fonts can be specified, using dynamic allocation (SVC99), in the application program that produces the output.

- Fonts can be specified in a PAGEDEF definition (up to 6 characters).

- If a font is not specified in any of the above, the default font specified in the PSF procedure is used. (If a CHARS subparameter is specified in the DEVICE initialization statement of JES3, then the PSF definitions are overridden.)

PAGEDEFs and FORMDEFs

- PAGEDEFs and FORMDEFs can be specified in the JCL of the job that produces the output using the PAGEDEF and FORMDEF parameters. The PAGEDEF and FORMDEF parameters can appear only in an OUTPUT statement.

- A PAGEDEF can also be specified using the FCB parameter in a DD statement. When using this method, the following restriction must be taken into account: The FCB parameter is limited to four characters, and a PAGEDEF name can be up to six characters.

- If a PAGEDEF and/or FORMDEF is not specified in any of the above, the default PAGEDEF and/or FORMDEF specified in the PSF procedure is used.

Page Segments

- Page Segments are usually specified in Overlays.

- Page Segments can be specified in-line in the output data stream using the IPS (Include Page Segment) structured field record. The IPS record can either place the segment in a specific position relative to the page origin, or position the segment at the current print position.

- The Page Segment can also be specified in a PAGEDEF, but this alone does not make the Page Segment print. This is only used for performance reasons and an IPS structured field is required.

■ When using DCF:Script/VS Language, use the SI (Segment Include) control word to identify a segment to be included (for example, in a specific column when the document is printed). The segment is either centered, or left or right aligned according to the current text formatting settings.

─── *NOTE* ──
A Page Segment can be printed only in the ACROSS direction, regardless of the print direction you specify in your page definition. Therefore, you must build the Page Segment rotated to the same print direction as the page on which you are printing.

Overlays

■ Overlays are specified in a FORMDEF definition.

■ Overlays can be specified in-line in the output data stream using the IPO (Include Page Overlay) structured field (PSF version 2 and later only). Print position may be relative to the current line, or defined for a specific position on the page. The Overlays must be listed in a PAGEDEF and invoked using the IPO structured field.

Categories of AFP Applications

Applications that produce output intended to print on AFP printers are grouped into five categories. The categories are divided by the level of AFP architecture implementation. A detailed description of the five categories and how to implement them can be found in the IBM *Advanced Function Printing Application Development Guide GG66-0255* and in *Developing Advanced Application for PSF-Controlled Printers GG66-3219.* Following is a brief description of each of the categories:

Category 1

Once PSF is installed, all the output printed without using any AFP software is Category 1. This output is printed using PSF and AFP printers but does not take advantage of any AFP capabilities. Category 1 is usually used for a very short period.

The printing mode of Category 1 output is Line Mode.

Category 2

AFP printing characteristics are defined on an installation wide basis. All (or most) output is printed using the same printing characteristics. Category 2 is simple to implement because PAGEDEF and FORMDEF are used installation wide and only have to be defined in one place – the PSF procedure.

The printing mode of Category 2 output is also Line Mode.

Category 3

AFP printing characteristics are defined on a dataset basis. Each output dataset may use different AFP printing characteristics. PAGEDEF and/or FORMDEF can be defined in JCL, on a DD statement level. Each DD statement can refer to an OUTPUT statement, since PAGEDEF and FORMDEF printing parameters are assigned in the OUTPUT statement.

Category 3 is a very common method of printing AFP output. This is because of the simplicity of specifying the PAGEDEF and/or FORMDEF in the JCL. No application modifications are required.

The printing mode of Category 3 output is also Line Mode.

Category 4

AFP printing characteristics are defined on a page-by-page basis. Each page of the output may use different AFP printing characteristics.

There are a number of AFP structured fields that can be inserted in-line within the data stream. This insertion turns Category 3 output into Category 4 output. These structured fields are:

Table 1   Category 4 Structured Fields

Field	Description
IDM	Invoke Data Map
IMM	Invoke Medium Map
CTX/PTX	Composed-Text Data/Presentation-Text Data
IPS	Include Page Segment
IPO	Include Page Overlay (PSF version 2)

IDM and IMM

Category 4's method of IDM and IMM command insertion is to assign a general PAGEDEF and/or FORMDEF on the dataset level (same as Category 3). The PAGEDEF consists of a number of Page Formats. The FORMDEF consists of a number of Copy Groups. By inserting an AFP structured field (command) in-line, the page is printed using a specific Page Format and/or Copy Group from within the defined PAGEDEF/FORMDEF.

Figure 1   Every PAGEDEF Can Consist of More Than One Page Format

PAGEDEF A

| Page Format 1 |
| Page Format 2 |
| : |
| : |
| Page Format #n |
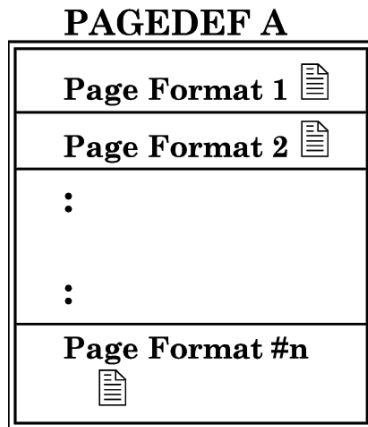
To select a specific Page Format from a PAGEDEF, an AFP structured field must be inserted in-line at the beginning of the page. This AFP structured field is called IDM (Invoke Data Map).

Figure 2   Every FORMDEF Can Consist of More Than One Copy Group

FORMDEF A

| Copy Group 1 |
| Copy Group 2 |
| : |
| : |
| Copy Group #n |
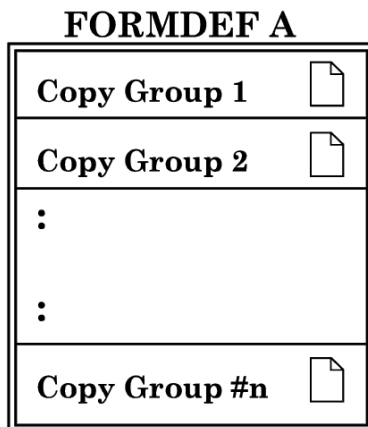
To select a specific Copy Group from a FORMDEF, another AFP structured field is required at the beginning of the page. This AFP structured field is called IMM (Invoke Medium Map).

All subsequent line formats are now printed using that specific Page Format/Copy Group until superseded by a new IDM/IMM control record.

Pages that do not have an IDM or IMM structured field are printed with the most recent specified IDM or IMM. If the output does not contain an IDM or IMM, then PSF uses the default Page Format and Copy Group, whichever is listed first in the active PAGEDEF and FORMDEF.

CTX/PTX

CTX and PTX are the same (that is, before PSF version 2, PTX was called CTX). They enable you to specify presentation text data (composed text data) within Line Mode output. Lines and boxes can be drawn, fonts can be changed, and text can be positioned. A CTX/PTX can be inserted anywhere on a page. Unlike IDM and IMM, the CTX/PTX takes effect only for the specific page and position on which it appears.

IPS and IPO

IPS is used for including a Page Segment. IPO is used for including an Overlay in Category 4 output. IPS and IPO can be inserted anywhere on a page. Unlike IDM and IMM, when a page segment is included within a composed-text (CTX) page or overlay, remember that any image included in the segment has an orientation relative to the page or overlay orientation, not the text orientation.

The printing mode of Category 4 output is Line Mode.

> ── **NOTE** ──────────────────────────────
> IPO is available only with PSF version 2 and above.

Category 5

AFP printing characteristics are defined on a free-form basis. Based on input data, the application (or software product) determines how to format the output. Category 5 output is also called AFPDS (AFP Data Stream). Category 5 output is most commonly produced by software packages such as DCF and GDDM. It is not yet common for user applications to produce Category 5 output.

The primary difference between Category 4 output and Category 5 output is that Category 5 output does not use a PAGEDEF. Each page is fully formatted by the application. Category 5 output does use a FORMDEF. One output dataset can contain both Category 5 output (Page Mode) and regular Line Mode output, but not on the same page.

The printing mode of Category 5 output is Page Mode.

When Page Mode printing is used, the print data stream presented to the printer is a combination of data and printer commands. It can be viewed online only with special software tools (for example, CONTROL-D/WebAccess Server or AFP Workbench).

AFP Categories Summary

Any of the five AFP output categories can be implemented with CONTROL-D. The next chapter contains a detailed discussion on implementing each of the AFP output categories.

Decollating AFP Output

The following topics are covered in this chapter:

- Output Decollating
- Output Retrieval
- Decollating from the System Spool
- Decollating Directly from CDAM

Output Decollating

Report decollating establishes report ownership. A report may belong either entirely to one user or to several users. Different pages of one report may belong to different users.

Output Retrieval

CONTROL-D can retrieve output in one of two ways:

- From the system spool
- Directly from Compressed Dataset Access Method (CDAM) compressed sysouts

CONTROL-D output retrieval is extremely flexible, allowing the exact requirements of each user to be met.

CONTROL-D has the ability to decollate information that resides on a 32K column page.

The WHEN line and column range parameters specify the area on a report page in which the identifying character string is to be located.

The special line range 999-999 is used to describe decollation of the entire page as a stream of data. It is usually used when decollating a sysout in Page Mode. When a sysout is produced in Page Mode (as opposed to Line Mode), there are no real line numbers in the report (usually used for graphics). There is no way to check for line range. The search for the string is performed on the entire page.

The special column number 999 is used to describe decollation of an entire row. The string search is performed on the entire row (useful for AFP format lines that are longer than 998 characters).

Each report (on the JCL DD statement level) can be defined for retrieval by either of the two methods mentioned above. One job can produce two reports, one report being retrieved from the system spool and the other directly from CDAM.

Decollating from the System Spool

Decollating from the system spool does not require any JCL changes, and can be immediately implemented on any given report. CONTROL-D can retrieve output from the system spool from any output class, held or not held. (On JES3, there are two different methods to handle outputs. For details, see the CONTROL-D chapter in the *INCONTROL for z/OS Installation Guide*. The main difference between processing held and not held output is: With held output, CONTROL-D copies the output and leaves the original output on the system spool. With not held output, CONTROL-D moves the output, purging the output from the system spool after safely retrieving it. Held output retrieval is normally only used for initial implementation and testing of new reports in CONTROL-D.

The work flow of output retrieval from the system spool is outlined below:

- Jobs write reports to the system (JES) spool.
- The CONTROL-D monitor reads the reports from the system spool.
- The CONTROL-D monitor writes the reports to compressed datasets (CDAM), while deleting the original copy from the system spool (not held output).

The decollating process builds an index for all the reports.

Figure 3   Index Production During Decollation
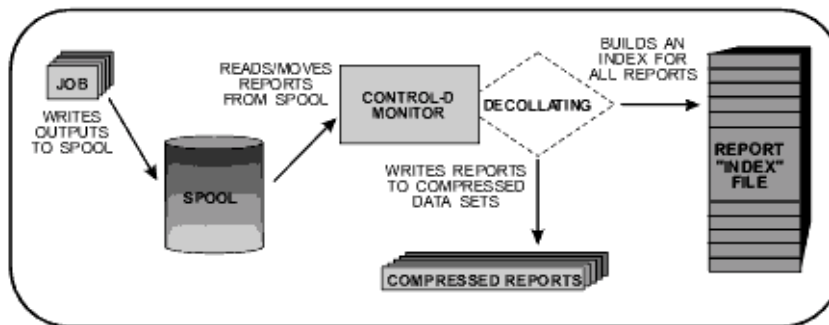
There are two types of decollating missions:

- A report decollating mission, that contains all instructions required for CONTROL-D to process one job name, that is, one report decollating mission per job.

- A generic decollating mission, that contains all instructions required for CONTROL-D to process a selected group of output from one or more predefined classes, that is, one generic decollating mission for one or more jobs. A good example for the use of a generic decollating mission is decollating the MSGCLASS output from production jobs. Using this method, every job that produces output in the generic decollating (sysout) class is automatically decollated.

Decollating Directly from CDAM

Output retrieval directly from CDAM compressed sysouts is performed for jobs that write the reports directly to CDAM datasets, bypassing the system spool.

Figure 4   Decollating Directly from CDAM
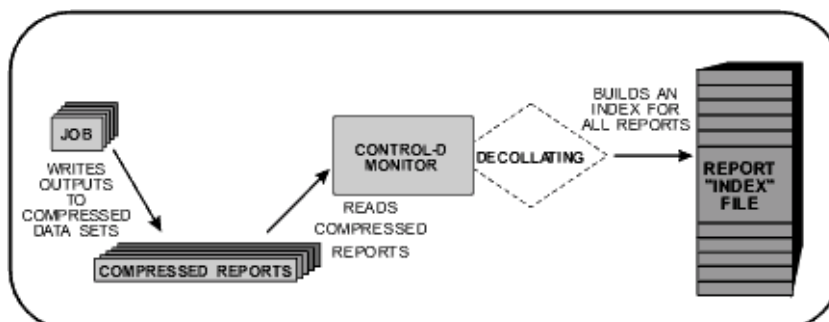
This technique requires only minor JCL changes and provides many advantages. Listed below are several advantages of the CDAM technique:

- The reports are written directly to compressed sysout; they do not pass through the system spool. Consequently, redundant read and write operations are eliminated and computer resources are conserved.

- The elapsed time for jobs that create large reports is reduced by 10% or more.

- The CDAM facility performs report compression. Depending on the type of data compressed, the compression rate is 30% – 70%. A significant amount of disk space is saved by this process.

- Regular conventional security methods (for example, RACF, ACF2, TOP-SECRET) protect CDAM sysout (datasets).

- The risk of 100% spool utilization is considerably reduced because the spool is minimally utilized.

- There is no danger of SB37 abends due to insufficient disk space (for the compressed sysout).

AFP users can also specify PAGEDEF and FORMDEF parameters in the DD statement and not in the OUTPUT statement.

Implementing the "Direct to CDAM" Method

Examples of JCL writing directly to CDAM is provided below:

Example 1

Figure 5   Example JCL - Before CDAM

```
//MYJOB    jobcard
//STEP01   EXEC   PGM=MYPROG
//SYSUT1   DD     DSN=ABC.DEF
//SYSUT2   DD     SYSOUT=P,CHARS=(GS12,SR12),
//  DCB=OPTCD=J
```

Example 2

Figure 6   Example JCL - After CDAM

```
//MYJOB    jobcard
//STEP01   EXEC   PGM=MYPROG
//SYSUT1   DD     DSN=ABC.DEF
//SYSUT2   DD     SUBSYS=(CDAM,'SYSOUT=P,'
//  'CHARS=(GS12,SR12),OPTCD=J')
```

A JCL example of writing directly to CDAM using the FORMDEF and PAGEDEF parameters:

Example 3

Figure 7   Example JCL - Before CDAM with FORMDEF and PAGEDEF

```
//MYJOB    jobcard
//OUT1     OUTPUT    PAGEDEF=W24OF2, FORMDEF=A11010
//STEP01   EXEC      PGM=MYPROG
//SYSUT1   DD        DSN=ABC.DEF
//SYSUT2   DD        SYSOUT=P, OUTPUT=*.OUT1
```

Example 4

Figure 8   Example JCL - After CDAM with FORMDEF and PAGEDEF

```
//MYJOB    jobcard
//STEP01   EXEC   PGM=MYPROG
//SYSUT1   DD     DSN=ABC.DEF
//SYSUT2   DD     SUBSYS=(CDAM, ' SYSOUT=P, '
//   ' PAGEDEF=W24OF2, FORMDEF=A11010' )
```

All printing characteristics must be specified in the SUBSYS DD statement. There are certain situations that may require specification of some or all of the printing characteristics in other places for greater flexibility and additional capabilities. This is discussed in "Category 3" on page 38.

Output Produced by Dynamic Allocation

Certain data centers produce output using SVC99, or in other words, dynamic allocation. In these situations, there are no DD statements in the job's JCL that represent the output. To have the output sent directly to CDAM, a modification in the dynamic allocation routine used in the data center is required to instruct the dynamic allocation routine to send the output to the CDAM subsystem instead of sending it to the system spool.

The problem that may arise when modifying the data center's dynamic allocation program is that not all output produced by dynamic allocation should be sent directly to CDAM. This situation is especially obvious during the implementation process of CONTROL-D. CONTROL-D is usually implemented in stages. The implementation process does not take a long time, but it is still usually performed in stages.

A simple way of implementing the creation of output directly to CDAM when using dynamic allocation is to have the dynamic allocation program check if a specific DD statement appears in the job's JCL. For example, the DD statement name can be CDAM and the DD statement could be a DD DUMMY statement. When a specific job (or job step) is required to produce output directly to CDAM, all that must be done is

to add the special DD statement to the job's JCL. The dynamic allocation program notices the special DD statement, and automatically perform the required modification. The required modification sends the output directly to the CDAM subsystem.

Using this method, the dynamic creation of output directly to CDAM can be on a job level (or even in specific job steps), while other output is sent to the system spool as before.

5

How to Implement AFP Output by Categories

This chapter describes how CONTROL-D retrieves data and printing characteristics in each of the five AFP output categories. In other words, this chapter outlines how to implement AFP output by categories.

Category 1

Category 1 output does not require any CONTROL-D actions. The output is printed as it is produced by the application program. Do not assign any printing characteristics to Category 1 output in CONTROL-D.

Using CDAM Allocation Option JOBSDSN*n* With Category 1 Output

When many small reports are produced by many jobs, the CDAM allocation option JOBSDSN1 (for Category 1) is recommended. Using this method, output is written to the system spool (that is, not using the "Direct to CDAM" method). For additional information on the CDAM allocation option JOBSDSN1, see Chapter 5 of the *CONTROL-D User Guide.*

Category 2

Category 2 output relies on global system printing characteristics defined in the PSF procedure. No CONTROL-D actions are required, and no printing characteristics are assigned to Category 2 output in CONTROL-D.

Using CDAM Allocation Option JOBSDSN*n* With Category 2 Output

When many small reports are produced by many jobs, the CDAM allocation option JOBSDSN1 (for Category 2) is recommended. Using this method, output is written to the system spool (that is, not using the "Direct to CDAM" method). For additional information on the CDAM allocation option JOBSDSN1, see Chapter 5 of the *CONTROL-D User Guide.*

Category 3

Category 3 output uses printing characteristics that are defined in external resource libraries (for example, Fonts, FORMDEFs, PAGEDEFs, and so on). Printing characteristics, with the exception of the FORMDEF and PAGEDEF parameters, can be specified using a number of methods. The FORMDEF and PAGEDEF parameters must be specified in an OUTPUT statement in the JCL of the job that creates the output. The rest of the printing characteristics can be specified by the application program in the JCL of the job that creates the output, using dynamic allocation (SVC99).

In data centers that use a relatively small variety of PAGEDEFs and FORMDEFs, it may be an advantage to use the combined PAGEDEF and FORMDEF method. This method relies on the creation of one global PAGEDEF and one global FORMDEF used by the entire data center. Using the CONTROL-D APAPARM option, the correct Page Format and Copy Group is used for each report. For additional details regarding this method, refer to "Using a Global PAGEDEF and FORMDEF" in Chapter 14, "Performance Considerations."

Category 3 Output Using the Spool Method

CONTROL-D automatically retrieves all the printing characteristics that are available on the DD statement level. Here are two examples of using the spool method:

Example 1

All printing characteristics are defined in JCL; none appears in the decollating mission definition:

Figure 9   Example 1 – Category 3 Output Using the Spool Method. JCL

```
//MYJOB1   jobcard
//STEP01   EXEC   PGM=MYPROG
```

```
//SYSUT1  DD    DSN=ABC.DEF
//SYSUT2  DD    SYSOUT=P,CHARS=GS10,FCB=STD2
//
```

Figure 10   Example 1 – Category 3 Output Using the Spool Method. Decollating Mission Definition

```
ON CLASS      = P        EXTWTR              DEST          FORM
PRT COPIES 01 LVL 20 USER MGT                DEST RUR252   MAX COPIES
    PRINT/CDAM PARMS =
WHEN LINE    -    COL    -    PRINT  REF NEXT PAGE   CONTID   AND/OR
       STRING =
```

Example 2

Certain printing characteristics are defined in the JCL; others are defined in the decollating mission definition:

Figure 11   Example 2 – Category 3 Output Using the Spool Method. JCL

```
//MYJOB2  jobcard
//STEP01  EXEC  PGM=MYPROG
//SYSUT1  DD    DSN=ABC.DEF
//SYSUT2  DD    SYSOUT=P,CHARS=GS10
```

Figure 12   Example 2 – Category 3 Output Using the Spool Method. Decollating Mission Definition

```
ON CLASS      = P        EXTWTR              DEST          FORM
PRT COPIES 01 LVL 20 USER MGT                DEST RUR252   MAX COPIES
    PRINT/CDAM PARMS =  PAGEDEF=W240F2,FORMDEF=A11010
WHEN LINE    -    COL    -    PRINT  REF NEXT PAGE   CONTID   AND/OR
       STRING =
```

Using CDAM Allocation Option JOBSDSN*n* With Category 3 Output

When many small reports are produced by many jobs and each report may have different printing characteristics, using the CDAM allocation option JOBSDSN2 (for Category 3) is recommended. Using this method, output is written to the system spool (that is, not using the "Direct to CDAM" method). Only when many small reports are produced with the same printing characteristics (for example, MSGCLASS output), CDAM allocation option JOBSDSN1 is recommended. For additional information on CDAM allocation options JOBSDSN1 and JOBSDSN2, refer to Chapter 5 of the *CONTROL-D User Guide.*

Category 3 Output Using the CDAM Method

During the decollating process, CONTROL-D retrieves all printing characteristics of the output as specified in the SUBSYS DD statement. No additional actions need to be performed. Printing characteristics can also be assigned in the decollating mission. This can be performed by specifying the printing characteristics in the PRINT/CDAM PARMS field of the decollating mission definition. When defining printing characteristics in the PRINT/CDAM PARMS field, CONTROL-D performs a syntax check on the printing parameters. Any printing characteristics that appear in the PRINT/CDAM PARMS field override printing characteristics that were specified in the SUBSYS DD statement of the job that created the output.

Example 1

All printing characteristics are defined in the JCL; none is defined in the decollating mission definition:

Figure 13   Example 1 – Category 3 Output Using CDAM Method. JCL

```
//MYJOB1   jobcard
//STEP01   EXEC   PGM=MYPROG
//SYSUT1   DD     DSN=ABC.DEF
//SYSUT2   DD     SUBSYS=(CDAM,'SYSOUT=P,CHARS=GS10,'
//                'PAGEDEF=W24OF2,FORMDEF=A11010,PREFIX=M73')
```

> **NOTE**
>
> As you can see in the above example, the CDAM parameters can span more than one line. Be sure to follow this syntax.

Figure 14   Example 1 – Category 3 Output Using CDAM Method. Decollating Mission Definition

```
ON DSN         = PREFIX=M73
   PRT COPIES 01 LVL 20 USER MGT                    DEST RUR252    MAX COPIES
       PRINT/CDAM PARMS =
WHEN LINE     -      COL     -      PRINT  REF NEXT PAGE   CONTID    AND/OR
       STRING =
```

Example 2

Certain printing characteristics are defined in the JCL; others are defined in the decollating mission definition:

Figure 15   Example 2 – Category 3 Output Using CDAM Method. JCL

```
//MYJOB2  jobcard
//STEP01  EXEC  PGM=MYPROG
//SYSUT1  DD    DSN=ABC.DEF
//SYSUT2  DD  SUBSYS=(CDAM,' SYSOUT=P,CHARS=GS10,PREFIX=M73' )
```

Figure 16   Example 2 – Category 3 Output Using CDAM Method. Decollating Mission Definition

```
    ON DSN       = PREFIX=M73
    PRT COPIES 01 LVL 20 USER MGT                        DEST RUR252   MAX COPIES
        PRINT/CDAM PARMS =  PAGEDEF=W24OF2,FORMDEF=A11010
    WHEN LINE    -    COL    -     PRINT  REF NEXT PAGE   CONTID   AND/OR
        STRING =
```

Example 3

No printing characteristics are defined in the JCL; all printing characteristics are defined in the decollating mission definition.

Figure 17   Example 3 – Category 3 Output Using CDAM Method. JCL

```
//MYJOB2  jobcard
//STEP01  EXEC  PGM=MYPROG
//SYSUT1  DD    DSN=ABC.DEF
//SYSUT2  DD    SUBSYS=CDAM
```

Figure 18   Example 3 – Category 3 Output Using CDAM Method. Decollating Mission Definition

```
    ON CLASS     = P         EXTWTR              DEST         FORM
    PRT COPIES 01 LVL 20 USER MGT                        DEST RUR252   MAX COPIES
        PRINT/CDAM PARMS =  SYSOUT=P,CHARS=GS10
        PRINT/CDAM PARMS =  PAGEDEF=PDEF1,FORMDEF=A11010
    WHEN LINE    -    COL    -     PRINT  REF NEXT PAGE   CONTID   AND/OR
      STRING =
```

Notes

1. As the above example illustrates, multiple lines of the PRINT/CDAM PARMS parameter must not be delimited by a comma.

2. Printing characteristics can also be specified by job name and report name or by recipient name and report name. For more information, see Chapter 8, "The OUTPARM Option."

Each ON statement of the decollating mission has a PRINT/CDAM PARMS field. The printing characteristics that are specified in this field are used for all output processed by this ON statement. When the PRINT/CDAM PARMS field is used (that is, parameters are specified), a new PRINT/CDAM PARMS line opens so that additional printing characteristics can be specified if required.

Category 4

Category 4 output uses printing characteristics (for example, Fonts, FORMDEFs, PAGEDEFs, and so on) that are defined in external resource libraries. Additional in-line AFP commands (structured fields) are used for page formatting.

The external resources can be specified using a number of methods. (The exceptions are the FORMDEF and PAGEDEF parameters; these parameters must be specified in an OUTPUT statement in the JCL of the job that creates the output.) The printing characteristics (except FORMDEF and PAGEDEF) can be specified by the application program in the JCL of the job that creates the output, using dynamic allocation (SVC99).

Without CONTROL-D, the in-line structured fields must be inserted by the application program or by using the PPFA Conditional Processing option. They can be automatically inserted using the CONTROL-D APAPARM option, described in Chapter 6, "The APAPARM Option."

In data centers that use a relatively small variety of PAGEDEFs and FORMDEFs, it may be advantageous to use the combined PAGEDEF and FORMDEF method. This method relies on the creation of one global PAGEDEF and one global FORMDEF used by the entire data center. Using the CONTROL-D APAPARM option, the correct Page Format and Copy Group is used for each report. For additional details regarding this method, see "Using a Global PAGEDEF and FORMDEF" on page 98.

Category 4 Output Using the Spool Method

Certain printing characteristics are defined in the JCL statements or in the decollating mission definition and certain can be defined with the APAPARM option. For additional information, see "6The APAPARM Option" on page 47.

Example 1

The job name is PRTAFP1 and the report name is UPDATE REPORT. Assume that PAGEDEF, named PDEF, includes the Page Format named PFRMT1. The UPDATE REPORT requests that the specific Page Format named PFRMT1 be used. The job uses the default FORMDEF.

Figure 19   Example 1 – Category 4 Output Using the Spool Method. JCL

```
//PRTAFP1   jobcard
//STEP01    EXEC   PGM=MYPROG
//SYSUT1    DD     DSN=ABC.DEF
//SYSUT2    DD     SYSOUT=P,CHARS=GS10,FCB=PDEF
//
```

The member PRTAFP1 in the APAPARM library can contain the following:

Figure 20   Example 1– Category 4 Output Using the Spool Method. Decollating Mission Definition

```
+++UPDATE REPORT
IDM=PFRMT1
```

> ― **NOTE** ―
> The FCB parameter, in the AFP environment, can be used to specify the desired PAGEDEF.

Example 2

Figure 21   Example 2 – Category 4 Output Using the Spool Method. JCL

```
//PRTAFP2   jobcard
//STEP01    EXEC   PGM=MYPROG
//SYSUT1    DD     DSN=ABC.DEF
//SYSUT2    DD     SYSOUT=P,CHARS=GS10,
//
```

Figure 22   Example 2 – Category 4 Output Using the Spool Method. Decollating Mission Definition

```
ON CLASS      = P          EXTWTR             DEST       FORM
PRT COPIES 01 LVL 20 USER MGT                 DEST RUR252   MAX COPIES
    PRINT/CDAM PARMS =  PAGEDEF=PDEF1,FORMDEF=A11010
WHEN LINE     -    COL    -      PRINT REF NEXT PAGE  CONTID   AND/OR
    STRING =
```

Member PRTAFP2 in the APAPARM library must contain the following:

```
+++UPDATE REPORT
IDM=PFRMT1
```

Using CDAM Allocation Option JOBSDSN*n* With Category 4 Output

When many small reports are produced by many jobs and each report may have different printing characteristics, using the CDAM allocation option JOBSDSN2 (for Category 4) is recommended. Using this method, output is written to the system spool (that is, not directly to CDAM). When many small reports are produced with the same printing characteristics (for example, MSGCLASS output), CDAM allocation option JOBSDSN1 is recommended. For additional information on CDAM allocation options JOBSDSN1 and JOBSDSN2, refer to Chapter 5 of the *CONTROL-D User Guide.*

Category 4 Output Using the CDAM Method

The following are examples of Category 4 using the CDAM Method.

Example 1

The job name is PRTAFP1 and the report name is UPDATE REPORT. Assume that the PAGEDEF, named PDEF1, includes the Page Format named PFRMT1. The UPDATE REPORT requests that the specific Page Format named PFRMT1 be used.

Figure 23   Example 1 – Category 4 Output Using CDAM Method. JCL

```
//PRTAFP1   jobcard
//STEP01    EXEC   PGM=MYPROG
//SYSUT1    DD     DSN=ABC.DEF
//SYSUT2    DD     SUBSYS=(CDAM,'SYSOUT=P,CHARS=GS10,'
//                 'PAGEDEF=PDEF1,FORMDEF=A11010')
//
```

The member PRTAFP1 in the APAPARM library must contain the following:

Figure 24   Example 1 – Category 4 Output Using CDAM Method. Decollating Mission Definition

```
+++UPDATE REPORT
IDM=PFRMT1
```

Example 2

Figure 25   Example 2 – Category 4 Output Using CDAM Method. JCL

```
//PRTAFP2   jobcard
//STEP01    EXEC   PGM=MYPROG
//SYSUT1    DD     DSN=ABC.DEF
```

```
//SYSUT2   DD    SUBSYS=CDAM
//
```

**Figure 26   Example 2 – Category 4 Output Using CDAM Method. Decollating Mission
Definition**

```
ON CLASS      = P         EXTWTR              DEST         FORM
PRT COPIES 01 LVL 20 USER MGT                DEST RUR252   MAX COPIES
    PRINT/CDAM PARMS =  SYSOUT=P,CHARS=GS10
    PRINT/CDAM PARMS =  PAGEDEF=PDEF1,FORMDEF=A11010
WHEN LINE    -    COL    -     PRINT  REF NEXT PAGE   CONTID   AND/OR
    STRING =
```

The member PRTAFP2 in the APAPARM library can contain the following:

```
+++UPDATE REPORT
IDM=PFRMT1
```

Category 5

Category 5 output uses printing characteristics (for example, Fonts, FORMDEFs, and
so on) that are defined in external resource libraries. Each page is completely
formatted using AFP structured fields, and therefore the output is in page mode
(AFPDS). Additional in-line AFP commands (structured fields) can be used, for
example, for page-by-page copy grouping.

The external resources can be specified using a number of methods, with the
exception of the FORMDEF parameter. The FORMDEF parameter must be specified
in an OUTPUT statement in the JCL of the job that creates the output. The rest of the
printing characteristics can be specified by the application program in the JCL of the
job that creates the output, using dynamic allocation (SVC99). The application
program can switch between Copy Groups or Page Formats.

Without CONTROL-D, the in-line structured fields must be inserted by the
application program. With CONTROL-D, they can be automatically inserted using
the APAPARM option, described in .

In data centers that use a relatively small variety of FORMDEFs, it may be
advantageous to use the combined FORMDEF method. This method relies on the
creation of one global FORMDEF for the requirements of the entire data center. Using
the CONTROL-D APAPARM Option, the correct Copy Group is used for each report.
For additional details regarding this method, see
.

Using CDAM Allocation Option JOBSDSN2 With Category 5 Output

When many small reports are produced by many jobs, and each report may have different printing characteristics, you should use the CDAM allocation option JOBSDSN2 (for Category 5). With this method, output is written to the system spool (that is, not directly to CDAM).

6

The APAPARM Option

The APAPARM option is intended mainly for Category 4 output. It can be used for Category 3 output, and then the output is actually changed to Category 4 output. In certain cases, the APAPARM option may be required for Category 5 output.

The APAPARM option provides the ability to implement advanced AFP capabilities with minimum effort. Certain advanced AFP capabilities require application program modifications. When the APAPARM option is used, some of these capabilities can be implemented without having to modify application programs. In this way, the data center can take full advantage of many versatile AFP capabilities.

The APAPARM option is capable of assigning Page Formats and Copy Groups on a report level (not only on a DD statement level).

Category 4 Structured Fields

As mentioned in a previous chapter, there are a number of structured fields that can be used (that is, inserted in-line into the output) for Category 4 output. As a reminder, these structured fields are:

Table 2   Category 4 Structured Fields

Field	Description
IDM	Invoke Data Map
IMM	Invoke Medium Map
CTX/PTX	Composed-Text Data/Presentation-text data
IPS	Include Page Segment
IPO	Include Page Overlay (PSF version 2 and above)

The APAPARM option can insert any structured field in the output. This includes structured fields that are not used for Category 4 output. It is extremely uncommon to require the in-line insertion of structured fields that are not Category 4 structured fields. Therefore, the following section discusses only Category 4 implementation using the APAPARM option.

Implementing the APAPARM Option

During the CONTROL-D installation process, each channel attached (local) printer in the data center is defined. In CTDX003, the type of each printer is specified. CTDX003 resides in the IOA SAMPEXIT library. For each printer that is defined APA (for example, AFP printer), CONTROL-D invokes the APAPARM option.

Example of the printer type definition in CTDX003 of AFP type printers:

Figure 27   Example of the Printer Type Definition in CTDX003 of AFP Type Printers

```
CTDUX003        PRINTRS= (PRT1, APA,                          *
                          PRT2, APA,                          *
                          PRT3, APA,                          *
                          PRT4, APA),                         *
                          INDEX=ON,                           *
                          BANNER=NO
```

A special library is used to define the structured fields for each report. This library is allocated to DD statement DAAPA in the CONTROL-D Printers Control monitor (that is, CTDPRINT). The original name of this library is olprefd.olverd.APAPARM.

The library can be defined with RECFM set to V or to F. BMC Software recommend that you set RECFM to V, because if you set RECFM to F, you must add four bytes (RDW) before every AFP structured field.

— NOTE

Installations that already use the APAPARM option with a library that has RECFM set to F can use the CTDCNVAP utility (described in the procedure by that name in the IOA PROCLIB library) to automatically convert the setting of RECFM to V.

The APAPARM library contains one member for each job which produces output that requires structured fields to be inserted. The member name must be identical to the job name. Each member contains structured fields for all reports produced by the job.

— NOTE

Not all the AFP jobs and reports require the use of the APAPARM option. Only those jobs that create reports requiring the insertion of in-line resources must have a corresponding member in the APAPARM library.

In each member, there must be one line for each report produced (or group of reports if using masking for the report name) in the following format:

```
+++repname          (+++ starts in column 1)
```

Table 3   APAPARM Format

Parameter	Description
+++	Identification that the line is a report name line.
repname	This is the name of the report (maximum 20 characters). repname must be the same as the name of the report specified in the Report Decollating DO NAME parameter. repname can contain either the full report name, prefix of report name or a mask of report name or names. The report name or names mask may be composed of characters, asterisks (*) and question marks (?): *—Any character, group of characters, or no character ?—A single character

Examples

Table 4   Masking Formats

Format	Description
ABC*	The report name must begin with ABC (that is, prefix).
*D	The report name must end with D (that is, suffix).
ABC*D	The report name must begin with prefix ABC and end with suffix D. Any characters may be present between the prefix and the suffix.
*	All report names are selected.
A?B1	The report name must begin with prefix A and end with suffix B1. Any one character may be present between the prefix and the suffix.

Following the +++repname line, one or more structured field records may follow.

Any number of +++repname lines can be present in one APAPARM member.

For example, consider the following report decollating mission parameters:

```
JOBNAME=xxxxxxxx
...        DO NAME=report-name1
...        DO NAME=report-name2
```

The member xxxxxxxx in the APAPARM library can contain the following:

```
+++report-name1
printing characteristics-1
printing characteristics-2
+++report-name2
printing characteristics-1
```

Not every report requires special processing using the APAPARM option. The APAPARM library must only contain members for jobs that require in-line (in-stream) structured fields, and not for all jobs.

A sample member APAPARMS can be found in the APAPARM library.

When CONTROL-D prints the reports named report-name1 and report-name2, the structured field or fields specified on the lines following the +++ lines are automatically added at the beginning of each report.

The structured field records, following the +++repname line, are in Hexadecimal (Hex) format. (If it is a library with RECFM set to F, then it must be preceded with the RDW, length in bytes.) Here is the structure of the Hex format:

Table 5   Hex Format of the AFP Structure Field

4 BYTES	1 BYTE	2 BYTES	3 BYTES	1 BYTE	2 BYTES		
X'00400000	X'5A	length	SF identifier	flag	sequence number	data	padding

```
(ONLY FOR A LIBRARY WITH RECFM SET TO F)
```

The APAPARM option provides a simpler method of specifying some of the structured fields, in regular character format. CONTROL-D automatically translates the character format to Hex format at time of printing. The following two special commands can also appear between the AFP structured field records:

```
IMM=xxxxxxxx    (up to eight characters)
IDM=yyyyyyyy    (up to eight characters)
```

xxxxxxxx represents the name of the specific Copy Group in the current FORMDEF and yyyyyyyy represents the Page Format in the current PAGEDEF.

— **NOTE** —
When using this method, there is no need to specify the IMM and/or the IDM commands in Hex format.

For example, consider the following report decollating mission parameters:

```
JOBNAME = PRTAFP1

...        DO NAME = UPDATE REPORT



...        DO NAME = SUMMARY REPORT
```

The PRTAFP1 member in the APAPARM library can contain the following:

```
+++UPDATE REPORT
I MM=FORM1
I DM=UPDT
+++SUMMARY REPORT
I DM=SUMM
```

The Hex version could appear as follows (x' ' is not part of the syntax):

```
+++UPDATE REPORT
X' 5A0010D3ABCC000002C6D6D9D4F1404040'
X' 5A0010D3ABCA000002E4D7C4E340404040'
+++SUMMARY REPORT
X' 5A0010D3ABCA000002C6D6D9D4F1404040'
```

In this example, the UPDATE REPORT requires a special Copy Group and a special Page Format. The SUMMARY REPORT requires only a special Page Format. The SUMMARY REPORT uses the default Copy Group of the active FORMDEF while printing.

The APAPARM Option Flow

When printing bundles, CONTROL-D checks which type of printer is being used. If the printer type is APA, CONTROL-D searches in the APAPARM library for a member with the same name as the job name that produced the report that is currently going to be printed. If such a member does not exist, CONTROL-D prints the report without any special APAPARM process. If such a member exists, CONTROL-D searches in the member for a +++repname line that contains the name (or mask) of the report that is currently ready to be printed. If such a line does not exist, CONTROL-D prints the report without any special APAPARM process. If such a line exists, CONTROL-D inserts the structured fields that follow at the beginning of the report. If a new chunk is produced (that is, the report size is greater than the chunk size) while printing the report, CONTROL-D automatically adds the structured fields at the beginning of the new chunk.

Figure 28   Diagram of the APAPARM Work Flow
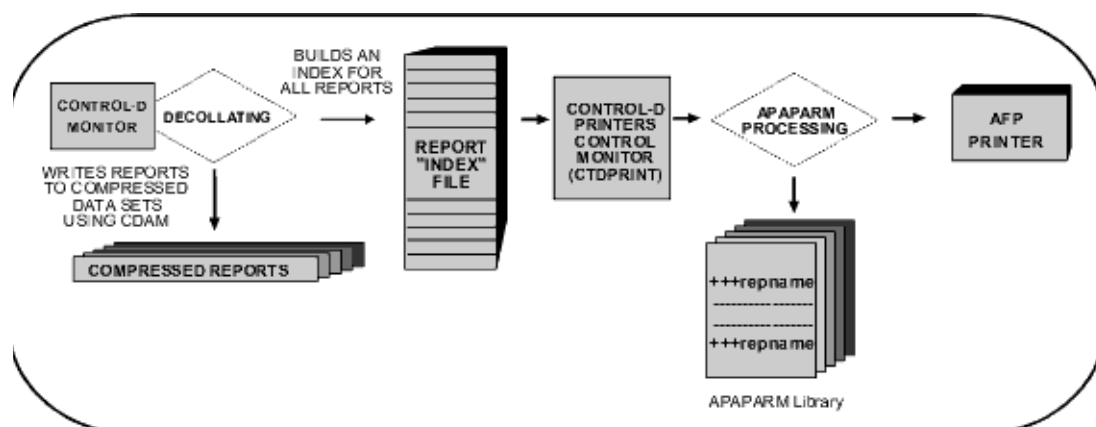
─── *NOTE* ──

If a new chunk is created when using the chunking mechanism, CONTROL-D adds the
structured field or fields at the beginning of each new chunk
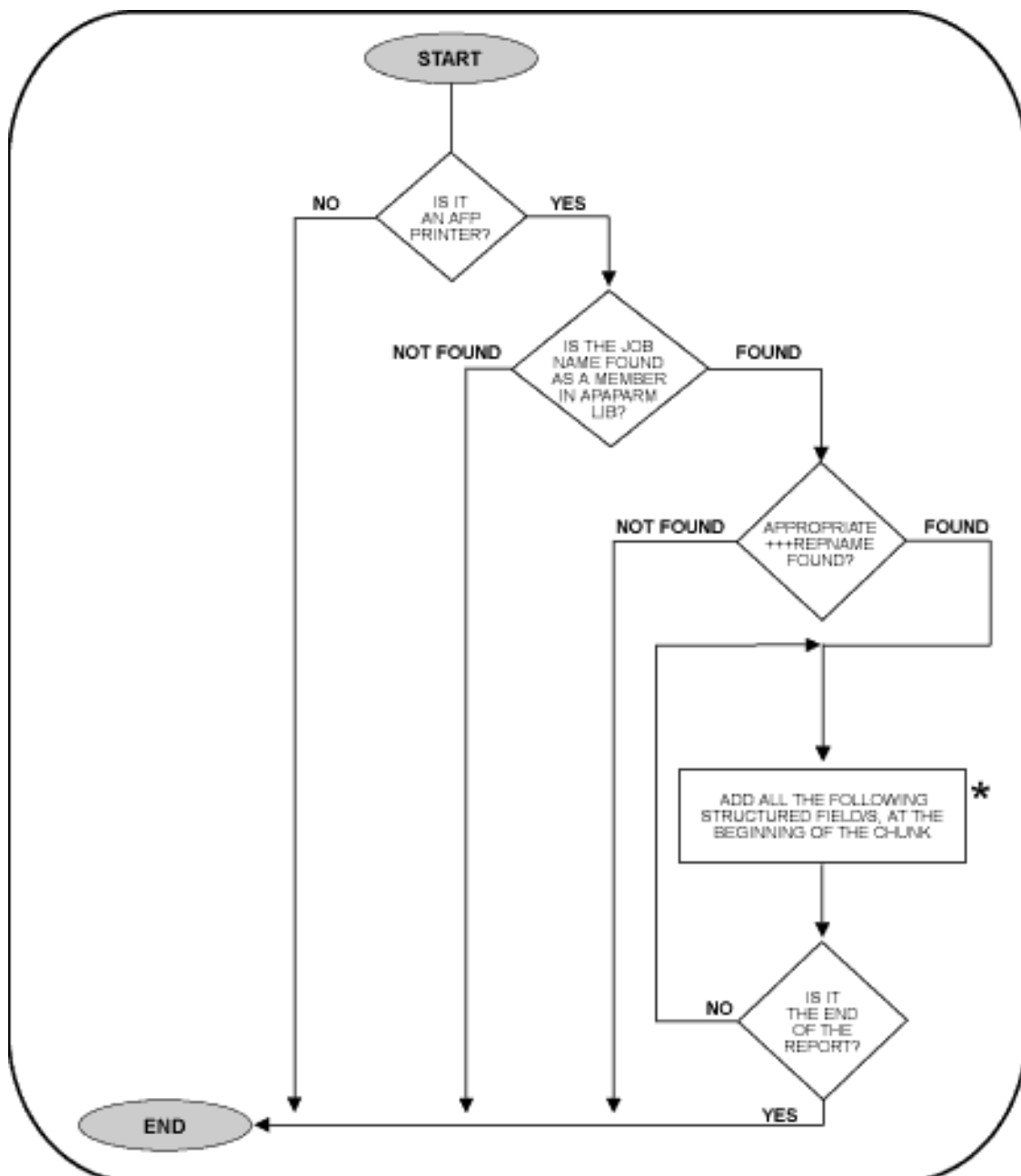
Figure 29   Diagram of the APAPARM Logic Flow

If a new chunk is created when using the chunking mechanism, CONTROL-D adds the structured field or fields at the beginning of each new chunk.

Online Viewing

The following topics are covered in this chapter:

- Before CONTROL-D AFP Support
- Viewing and Overriding Printing Characteristics After Report Decollating
- Online Viewing of Reports that Use Overlays (OGL)

Before CONTROL-D AFP Support

All reports processed by CONTROL-D can be viewed online using the CONTROL-D
User Reports (Online Viewing) facility, that provides many tools that assist in
productively viewing computer produced reports. Until now, online report viewing
of AFP reports has not been an available option because of the following:

- The terminal size – Computer produced reports are usually larger than the size of
  the terminal screen. Computer produced reports usually contain from 132 through
  255 characters in each line and from 60 through 80 lines on each page. Some
  reports are even larger. A standard terminal displays 80 characters in each line and
  24 lines on each page. Some terminals display more characters (for example, 132
  characters on each line), but the characters are very small and difficult to read.

- The use of graphical items – Many AFP reports are printed with Overlays.
  Overlays contain report titles, column headers, data frames (boxes) and other
  important graphic items. It is impossible to productively view online reports that
  print with overlays because of missing report titles, column headers, data frames
  (boxes) and other graphical items.

The problems mentioned above may be resolved by using a hardcopy report.
However, there are other problems that report recipients encounter, even with
printed reports. Consider the following issues:

- Partial or selective reports – Many reports include a large amount of data. Reports can be as large as hundreds of pages or even more. It is quite common for the report recipient not to need to use all of the lines of data, but only specific lines.

  Example: In a bank savings account report, the report recipient needs to check all deposits over $10,000. Out of the 100,000 deposits listed in the report, only 100 represent deposits of over $10,000.

  The problem in the example can be solved by producing an additional report for the report recipient including only deposits of over $10,000, but what happens if tomorrow the report recipient needs all deposits over $5,000? Does a new application have to be written or changed every day?

- Readability problem – At times, the combination of several factors (that are not easily discernible) determine which lines are included in the report. Even for a small report, the process of scanning these factors and manually marking relevant report lines is error-prone and time-consuming.

  Example: The report recipient needs all deposits over $10,000 but special handling is required if the over $10,000 deposit is the client's first deposit at the bank. The report recipient has to visually search the entire report and mark all relevant deposits.

  The list of problems that report recipients experience with printed reports is very long, even without taking into consideration the costs involved in printing the reports (paper, transportation, and so on).

The more we examine this issue, the more we realize how much online computer capabilities are needed; for example, the capability to include or exclude lines of a report according to a specified string, and the capability to highlight data according to specified criteria. The following explanations and examples of the CONTROL-D User Reports (Online Viewing) facility can be used to productively view AFP reports and solve the problems listed above.

Viewing and Overriding Printing Characteristics After Report Decollating

Once a report has been decollated, it can be viewed online by specifying Option U (User Reports) in the IOA Primary Option menu.

There are two types of report entries in the CONTROL-D report database:

- User report entries
- $SYSDATA report entries

User Report Entries

User report entries represent reports after the decollating (separation) process according to the instructions specified in the report decollating mission. The reports and parts of reports intended for each recipient are represented by a user report entry. These are the standard report entries that report recipients use to view their reports.

Figure 30   Active User Report List – Display Type D

```
ACTIVE LIST    <D>   JOB          REP                    USR MGT       CHILD (U)
COMMAND ===>                                                   SCROLL===> CRSR
O USER       REPORT              ODATE      PAGES    LINES V N STATUS
  DEBUGO1    SUMMARY REPORT      01/04/00      13      726   A Wait Print
  DEBUG14    EMPLOYEES REPORT    04/03/00     122    13426 V   Decollated
  DEBUGA13   EMPLOYEES REPORT    02/04/00      11     1526 V T Wait Print
  DEBUGC18   SUPPLY REPORT       01/02/00       1       77 V   Printed-Wait bkp
  DEBUGC18   MANAGEMENT REPORT   05/04/00      50     8316 V   Wait Print
  DEBUGC18   MANAGEMENT REPORT   05/04/00      50     8316     Wait Print
  DEBUGC19   MONTHLY REPORT      03/01/00       6      615   G Printed-Wait bkp
  DEBUGU06   TRAINING REPORT     02/05/00      21     4249 V G Printed-Wait bkp
  DEPT71U    EMPLOYEES REPORT    04/03/00     337    21117 V   Printed Restored
  DEPT71U    COST REPORT         05/05/00       4      323 V   Decollated Restore
  DEPT8      DUMP OF CICS        01/03/00     741    49651 V   Wait Print
  DEPT8      PRODUCTION FLOW     01/05/00     201     3428 V   Wait Print
  DEPT8U13   STUDENT REPORT LIST 02/04/00      15      937 V   Printed-Wait bkp
  PROD       INVENTORY REPORT    03/01/00       1       26 V G Printed-Wait bkp
  PRODCNTL   PRODUCTION JCL      05/04/00      64      835 V   Decollated-Wait bk
  PRODCNTL   REPORT 006789       01/02/00     584    17149 V T Decollated-Wait bk
  PROD8U13   MONTHLY REPORT      05/01/00       9      126 V T Wait Print
  PROD8U17   INVENTORY REPORT    03/03/00    1371    97527     Printed
  PROD8U17   REPORT 006921       04/05/00      94     1824     Wait Print
  PROD9      AFP TEST PC 2       02/04/00      10      100 V   Printed
 V VIEW E EDIT P PRINT U UPDT I INS D DEL N NOTE A ADD INFO G GIVETO    16.54.59
```

The User Report List can be displayed with a variety of display types. Each display type displays report information according to the report recipient's needs. For example, the above display type D displays each report on one line, with the information required by the average end-user. Display type A is intended for the INCONTROL administrator. This display type displays a large amount of information required by the INCONTROL administrator.

Figure 31   Active User Report List – Display Type A

```
ACTIVE LIST   <A>  JOB        REP                USR MGT       CHILD (U)
COMMAND ===>                                          SCROLL===> CRSR
O USER      REPORT NAME       JOB      JOB-NUM  CATEGORY            FROMUSER
  PROD      INVENTORY REPORT  M22TST   JOB 5432 TEST2
  Ordered: 03/01/00  Run:        00:00 To: 00:00 Decollated: 03/01/00 15:24
  Status : Printed              Remark :                   View: V
  Copies : 001 Form : STD       Class: 4         P-    10  L-     100
  Dest: CTDPC                   WTR:              Note:
  Record ID       : 3C0E4940      RBA:          UPDT:
  Print  Missions : STD1
  Restore Mission :
  Pagedef:         Formdef:      Output:         Chars: ****
  Additional Users :


----------------------------- end of record -------------------------------
  PRODCNTL PRODUCTION JCL       M07TST   JOB 149 DAILY
  Ordered: 05/04/00  Run: 05/04/00 17:10 To: 17:11 Decollated: 05/04/00 17:11
  Status : Wait Print           Remark : C0000            View: V
  Copies : 001 Form : STD       Class: W         P-     4 L-      49
  Dest:                         WTR:              Note:
  Record ID       : 3BC89E4E      RBA:          UPDT:
  Print  Missions :
P PRINT    V VIEW     U UPDATE    I INSERT    A ADD INFO    E EDIT
X INDEX    N NOTE     G GIVETO    D DELETE    Q QUICK ACCESS      18.11.46
```

The report list display type can be changed dynamically using the DISPLAY command (DI). There are many sample display types supplied with CONTROL-D. For additional information on display types refer to the online facilities chapter of the *CONTROL-D User Guide.*

Each data center can define its own display types according to its own requirements. For additional information on defining new display types refer to the IOA administration chapter in the *INCONTROL for z/OS Administrator Guide.*

A number of the printing characteristics can be viewed and updated for each report entry. The specific display type that is currently being used determines the exact printing characteristics that can be updated. Please note that a line command A can be entered in the Option field for each report entry, causing additional information for that report to appear. Using display type D, the following printing parameters can be updated:

- Number of copies
- Form
- Class
- Destination

When printing parameters are updated in the Active User Report List, the update takes effect only for the currently produced report. For permanent updates, the printing parameters must be updated in the Permanent User Report List. For additional information on the Permanent User Report List refer to the CONTROL-D and CONTROL-V chapter of the *INCONTROL for z/OS Administrator Guide.*

$SYSDATA Report Entries

$SYSDATA report entries represent the original report before the decollating process. $SYSDATA report entries are accessible to authorized users only.

Original report printing characteristics can be displayed (and modified if required) in the $SYSDATA records. $SYSDATA records appear in the Active and History Report Lists.

Figure 32   Active User Report List on $SYSDATA Records With Additional Information

```
ACTIVE LIST   <A> JOB          REP                 USR MGT $SYSDATA CHILD (U)
COMMAND ===>                                               SCROLL===> CRSR
O JOB       JNUM PROCSTEP PGMSTEP  DDNAME    PAGES    LINES DECOLLATION-TIME
  M89RKSL  28600          JES2     JESMSGLG      1       25 08/08/00 - 11:21
  CDAM: CTDP.R5.M89RKSL.J28600.D3601121.S91.N004700    Extents: 00
  Record ID       : AC2D25AE 54529000 RBA: 000004E0 UPDT: AC2D25AE 54529000
  Backup  Missions  :
  Backup  Volumes   :
  Restore Mission   :
  Creation Date     : D99360 - T112113      Status: Decollated
  Printing Parameters: CLASS: X  FORMS: STD   RECFM: UA     ALOPT :
                       APA : N  FCB  : ****  LRECL: 00133   WTR   :
                       ACIF : N  UCS  : ****  BLKSZ: 00133   OUTPUT:
                       TRC  : N  FLASH:        OPTCD:        MODIF :
                       LINCT: 0100  PGDEF:          FMDEF :
                       CHARS:       ,      ,       ,
  Job Parameters    : SYSID:       JTYPE:            ACCOUNT:
                      ENTRY:            -
------------------------------ end of record ----------------------------------
  M89RKSL  28600          JES2     JESJCL        3      231 08/08/00 - 11:21
  M89RKSL  28600          JES2     JESYSMSG     13      357 08/08/00 - 11:21
====== >>>>>>>>>>>>>>>  B O T T O M   O F   L I S T  <<<<<<<<<<<<<< ======
P PRINT     V VIEW    U UPDATE     I INSERT    A ADD INFO    E EDIT
X INDEX     N NOTE    G GIVETO     D DELETE    Q QUICK ACCESS      13.16.13
```

Online Viewing of Reports that Use Overlays (OGL)

Many AFP reports are printed with overlays. Overlays usually contain report titles, column headers, data frames (boxes) and other important text or data. It is usually impossible to productively view online reports that are printed with overlays on the mainframe because of the missing report titles, column headers, data frames (boxes) and other important text or data.

CONTROL-D/WebAccess Server is an integrated component of the CONTROL-D Output Management System. Using GUI, color graphics, and Windows conventions, it extends the comprehensive online viewing capabilities available (for example, WYSIWYG) to CONTROL-D users. For additional information, see Chapter 15, "PC/LAN Environment."

Following is a sample report that is normally printed with an electronic overlay. Note that when viewing the report online, only the data appears in the sample report display.

Figure 33   Sample Report With Data Only

```
------------- CONTROL-D/V REPORT VIEWING   NOTES   O   PAGE      1 OF        9
 COMMAND ===>                                              SCROLL ===> CRSR
 UR M41     RP INVENTORY           JB M41RPRT  02462   DT 240300 RUL
 ---+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----
1DATE:    05.05.00
 UPDATE:  05.05.00

                                  INVENTORY REPORT
                                  ----------------

 WAREHOUSE NO: 1001      DEPARTMENT:   100  -  FINAL ASSEMBLY SHOP
               ----                        --------------------------

                                SHELF   QNTY   QNTY        QNTY
 ITEM NO.       DESCRIPTION      LIFE    UNIT   AVAIL       ORDER
 -----------    ----------------  -----  ----   -------     -------
 1233-781-21    RIVET D. 0.1 ACR  NONE   KG     100.00      250.00
 1233-781-25    RIVET D. 0.5 ACR  NONE   KG     500.00      500.00
 1233-781-27    RIVET D. 0.7 ACR  NONE   KG     050.00      100.00
 1334-781-20    RIVET D. 0.9 ACP  NONE   KG     701.00      099.00




 CMDS: FIND str (PREV), EDIT, RULER on/off/name, VALUE, N n P p       11.17.07
```

By defining a ruler (a logical report view), the report can be displayed with the information required to productively view the report online. The following sample report is the same report as displayed above, except that a ruler has been applied to the report:

Figure 34   Sample Report With Data

```
------------- CONTROL-D/V REPORT VIEWING   NOTES   O   PAGE      1 OF        9
 COMMAND ===>                                              SCROLL ===> CRSR
 UR M41     RP INVENTORY           JB M41RPRT  02462   DT 240300 RUL
 ---+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----
1DATE:    05.05.00         INVENTORY REPORT         WAREHOUSE NO:   1001
 UPDATE:  05.05.00         FINAL ASSEMBLY SHOP      DEPARTMENT:     100


                                QNTY        QNTY        SHELF   QNTY
 ITEM NO.       DESCRIPTION      AVAIL       ORDER       LIFE    UNIT

 1233-781-21    RIVET D. 0.1 ACR  100.00      250.00      NONE    KG
 1233-781-25    RIVET D. 0.5 ACR  500.00      500.00      NONE    KG
 1233-781-27    RIVET D. 0.7 ACR  050.00      100.00      NONE    KG
 1334-781-20    RIVET D. 0.9 ACP  701.00      099.00      NONE    KG
 1337-781-37    RIVET D. 0.6 ACR  159.00      141.00      NONE    KG
 1536-781-11    RIVET D. 0.1 ACP  250.00      050.00      NONE    KG
 1557-781-40    RIVET D. 0.7 ACR  341.00      059.00      NONE    KG
 CMDS: FIND str (PREV), EDIT, RULER on/off/name, VALUE, N n P p       11.17.07
```

Note that the headers are displayed together with column separators. This example demonstrates how simple it is to define overlays for reports that are required for on-line viewing.

The report editing features described below eliminate the inconvenience inherent in traditional online viewing and inject new life into cluttered business reports. Following are the major features:

- Freezing Headers – You can freeze report header lines. As you scroll up and down through the report, only the data items scroll; the column header remains fixed. This enables you to know at a glance what each data item represents.

- Freezing Columns – You can freeze report columns. This enables you to scroll right or left, and the frozen report columns remain in the same position on the screen.

- Including Report Lines – Based on line content, you can select the report lines you require. For example, you can display only product lines with available quantity less than 100 items. Instead of browsing through pages of irrelevant data, you can display only the data you need.

- Excluding Report Lines – The Exclude option enables you to select report lines for exclusion from the report based on the appearance of a string or strings in specified column locations. Report lines conforming to the specified string criteria are not included in the report display.

- Highlighting Important Data – You can color or highlight data in the report based on its contents. For example, color in red only the exception values. Instead of looking for the data manually, CONTROL-D searches for you.

- Redesigning the Report – You can easily redesign an old report to suit new business needs. You can move columns, add new and old headings, and color your report so your data takes on new meaning.

All this can be done without any change in the application generating this report.

8

The OUTPARM Option

The CONTROL-D OUTPARM option (also known as "CONTROL-D Global Control of the Printing Characteristics") allows overriding of default printing characteristics (specified at time of decollating) for all (or some) of the reports to be printed by CONTROL-D. In addition to the printing characteristics supported by the JCL OUTPUT statement (such as TRC, PRMODE, and so on), the following printing characteristics can also be controlled:

Table 6   OUTPARM Printing Characteristics

Characteristic	Meaning
BURST	FLASC
CHARS	FORMDEF
CHAR1	FORMS
CHAR2	MODIFY/MODIF (not relevant for AFP printers)
CHAR3	OPTCD
CHAR4	OUTPUT
CLASS	PAGEDEF
DEST	TRC
FCB	UCS
FLASH	UCSOP

The CONTROL-D OUTPARMS library is used with this option. Each member in this library refers to a job name (for example, the member name is the job name), or each member refers to a user id (for example, the member name is the recipient name). Note that all member names must refer either to job names or to user ids – the two cannot be mixed. This is defined in the CTDX003 member in the SAMPEXIT library – the OUTPARM parameter. For instructions on activating this option, see the CONTROL-D and CONTROL-V chapter of the *INCONTROL for z/OS Administrator Guide.*

An OUTPARM member contains the printing characteristics that are used for the reports.

The OUTPARM option can also be used for banners (deferred printing and immediate printing). For additional details, see Chapter 10, "Printing Banners."

Any reports that are not specified in the OUTPARMS library are printed with the default characteristics that were specified in the decollating mission or in the JCL parameters.

The OUTPARM option is usually used:

■ To enforce data center standards
■ To set specific printing characteristics for specific recipient reports

Enforcing Data Center Standards

It is most common to process (decollate) a specific group of reports that have identical criteria using generic decollating missions. For example, all production reports are retrieved by CONTROL-D, made available for online viewing for three days and archived for one month. In this case, one generic decollating mission can achieve that goal. Printing characteristics can then be assigned to the output class, enforcing data center standards for this type of output.

In the above example, all production MSGCLASS output is processed by one (generic) decollating mission, making data center standard enforcement quite easy. What happens, though, if data center standards need to be enforced for a number of different decollating missions? This situation can become even more complicated if many or all decollating missions in the data center are required to meet the standards set. The OUTPARM option enables you to enforce data center standards on a global level (that is, for one or more different decollating missions, whether generic or non-generic).

The advantages of being able to enforce data center standards can be demonstrated with the following example. Many components in the system may produce "dumps," usually as a result of an abend. These dumps are usually extremely large and utilize high percentages of system spool space. The dumps are important for debugging purposes, so that even if the system spool is almost full, purging the dumps from the spool is not a practical alternative. This then results in having to print the dumps unnecessarily (which wastes paper when compared to online viewing). At times it may be necessary to print dumps – for example, vendors of software products may require a printed dump. You can force printing a dump 2-up or, even better, 4-up.

Setting Global Printing Characteristics for Specific Recipients

In addition to specifying printing characteristics for output classes, printing characteristics can be assigned to a specific user or to a specific report. Using this feature, in a situation of different printer types for remote users, you are able to create different reports from one output group (dataset).

Defining an OUTPARM Member

In each OUTPARM member, there must be one line in the following format for each report:

```
+++repname   (+++ starts in column 1)
```

Table 7   OUTPARM Format

Parameter	Description
+++	Identifies the line as a report name line.
repname	This is the name of the report (maximum 20 characters). repname must be the same as the name of the report specified in the Report Decollating DO NAME parameter. repname can contain either the full report name or names, prefix of report name or names or a mask of report name. The report name or names mask may be composed of characters, asterisks (*) and question marks (?): *—Any character, group of characters, or no character ?—A single character

Examples

Table 8   Masking Formats

Mask	Description
ABC*	The report name must begin with ABC (that is, prefix).
*D	The report name must end with D (that is, suffix).
ABC*D	The report name must begin with prefix ABC and end with suffix D. Any characters can be present between the prefix and the suffix.

Table 8   Masking Formats

Mask	Description
*	All report names are selected.
A?B1	The report name must begin with prefix A and end with suffix B1. Any one character can be present between the prefix and the suffix.

Following the +++repname line, one or more printing characteristic parameter lines may follow. The printing characteristics parameters must start in column one.

Any number of +++repname lines can be present in one member, depending on the reports to be processed.

For example, when using the OUTPARM option by job name, consider the following report decollating mission parameters:

```
JOBNAME=GPLUPDAT
    ...    DO NAME=UPDATE REPORT
    ...    DO NAME=DUMP - JOB ABEND
```

The member GPLUPDAT in the OUTPARMS library can contain the following:

```
+++UPDATE REPORT
CHARS=GS10
PAGEDEF=UPDEF
+++DUMP - JOB ABEND
CHARS=DUMP
PAGEDEF=FOURUP
```

When CONTROL-D prints the report named UPDATE REPORT, the printing characteristics specified on the two lines that follow the +++UPDATE REPORT line are assigned to the report. This means that a specific font (GS10) and a special page definition (UPDEF) are assigned to that report.

When CONTROL-D prints the report named DUMP – JOB ABEND, the printing characteristics are different. In this example, the printing characteristics might be a PAGEDEF that prints 4-up. If the update job abends, the dump are printed 4-up to save paper. The appropriate font is also specified.

A sample member SAMPLE can be found in the OUTPARMS library.

Not every report requires special processing using the OUTPARM option. Use it only for reports that require special processing.

OUTPARM Flow

When the CONTROL-D Printers Control monitor is preparing to print a report, it searches for a member name. This member name can be the same name as the job name of the job that produced the report or the same name as the recipient who is to receive the report (according to the method selected during initial activation of the OUTPARM option). If a corresponding member is found, it then searches for a report name in the member, and assigns all printing characteristics to the report before sending it to the system spool.

Figure 35   Diagram of the OUTPARM Global Flow
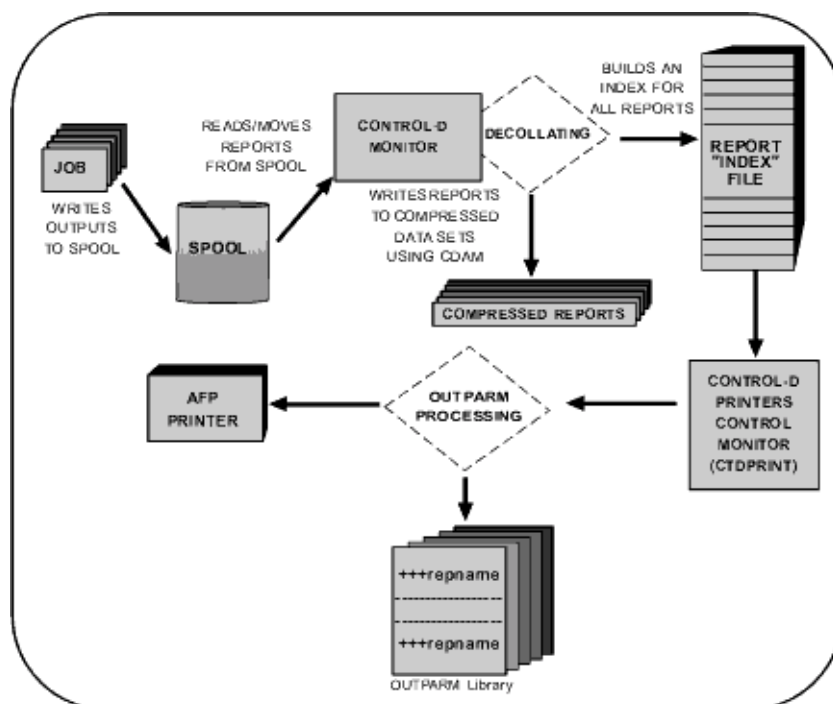
Figure 36   Diagram of the OUTPARM Logic Flow
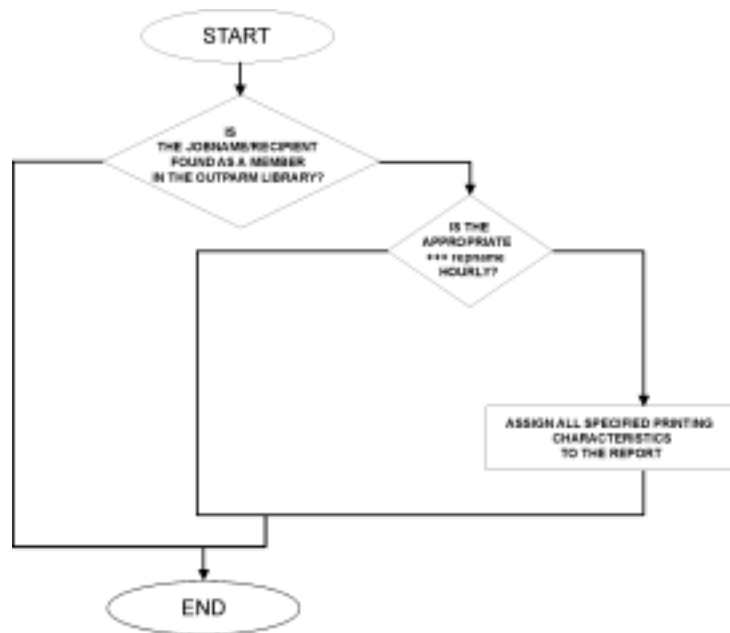
The OUTPARM option is invoked for both deferred printing (printing missions) and immediate printing requests.

Printing Reports

The following topics are covered in this chapter:

- Immediate Printing vs. Deferred Printing
- Defining a Printer
- Chunk Size Considerations
- Banner Pages

Immediate Printing vs. Deferred Printing

Immediate Printing

In the Active Report List screen, option P (Print) opens the Print Option window that enables you to request immediate report printing. This option is used to print reports that are not scheduled to be printed, or to request additional printed copies of reports that are scheduled for printing or have already been printed.

The report is immediately sent to the printer identified through the DEST and WTR fields (in the Print Option window).

All report printing characteristics are automatically assigned to the report including the APAPARM and OUTPARM options (if specified).

Deferred Printing

Deferred printing requests that reports be printed at a later time using a CONTROL-D printing mission together with other reports that the user receives in the bundle.

A printing mission is defined online in the Mission Definition facility (option M in the IOA Primary Option menu). The printing mission contains all the parameters needed to print a bundle. Printing missions are stored in standard libraries. Usually, a printing mission is defined for every type of printed form.

For a printing mission to become active, it must first be placed in the Active Missions file. The process of selecting a printing mission from the definition in the library, and placing it on the Active Missions file, is carried out by one of the following methods:

■ Automatically, by the New Day procedure (CTDNDAY).

■ Using a batch (DAILY) job (procedure CTDPRDAY).

■ Manually, from the Printing Mission Definition screen, using the Order and the Force options.

■ Manually, under ISPF using the online Utilities panel (the CTDPRTRQ CLIST).

■ Manually, under ROSCOE (using RPF CTDRQPRT).

For additional information concerning printing missions, see the CONTROL-D and CONTROL-V chapter of the *INCONTROL for z/OS Administrator Guide.*

Defining a Printer

The PRINTER parameter (in member CTDPARM in the IOA PARM library) defines the logical printers on which CONTROL-D can print. For each local printer in the data center, the following information must be specified:

■ Logical printer name – JES logical printer name.

■ Destination code – JES destination code.

■ Lines per minute – Speed of the printer in lines per minute. (In a data center that only uses Page Printers, the number of pages per minute must be specified.)

■ Printer status – Initial status of the logical printer.

■ Chunk size – Default size of the chunk sent to the printer. CONTROL-D supports two techniques for printing:

— One-Chunk Method.
— Multi-Chunk Method.

These methods are discussed in the following pages.

■ Printer type – Printer type must be defined in exit CTDUX003 for deferred printing, and exit CTDUX014 for immediate printing. The printer type can be:

— APA – All Points Addressable Printer (or AFP page printers such as the 3800-3, 3820, 3835, 3900, and so on).

— REG – Regular Impact Printer.

— LAS – Laser Printer (all laser printers, except those working in APA mode – such as 3800-1).

— XER – XEROX 97xx Laser Printer or any DJDE printer.

— FOB – SIEMENS 2200 Model 2 and 2300 Model 2 Laser Printing Subsystems.

For more information concerning printer definition, refer to the CONTROL-D chapter in the *INCONTROL for z/OS Installation Guide*, and the CONTROL-D and CONTROL-V chapter in the *INCONTROL for z/OS Administrator Guide.*

Chunk Size Considerations

CONTROL-D automatically balances printing of bundles between different printers in the data center by dynamically deciding which printer is to print each bundle. Based on the speed of the available printers, the type of the printer, the size of each bundle waiting to be printed and the user-specified bundle priority, CONTROL-D achieves maximum printing throughput.

The speed of the printers is estimated by CONTROL-D according to the user- defined printing speed value.

One-Chunk Method

The entire bundle is sent to the spool for printing at one time. This method is activated by setting CHUNKSIZE in the printing mission definition to 0. If it is not specified in the printing mission definition, CHUNKSIZE defaults to the value that was defined during the installation process (in the PRINTER parameter of member CTDPARM in the IOA PARM library).

This method can be used for printing reports that contain identical printing characteristics. If reports containing different printing characteristics are processed in this manner, the characteristics of the first report are used as a default for all the reports in the bundle.

When using the CDAM PAGEDEF and/or FORMDEF printing parameters, the PAGEDEF and/or FORMDEF are added in-line prior to the data, so in this case, setting CHUNKSIZE to 0 is not valid.

Multi-Chunk Method

In this method, CONTROL-D creates a new chunk each time the number of lines specified in the CHUNKSIZE parameter is exceeded, or when printing characteristics for the reports change, whichever occurs first (unless CHUNKSIZE is specified as "0" as described previously). CHUNKSIZE may be specified in the printing mission definition. If it is not specified in the printing mission definition, CHUNKSIZE defaults to the value specified during the installation process.

Multi-chunk processing has two major advantages:

- Preventing overloading of the spool by controlling the size of the chunk.
- Printing of reports with different printing characteristics within one bundle.

The multi-chunk method in CONTROL-D is a unique design and enables reports containing any printing characteristics to be bundled in one bundle. Therefore, this method is the recommended method for AFP report printing.

Banner Pages

Banner exits supplied with CONTROL-D print different types of banner pages. The banner pages are defined in the library allocated to the DD statement DABANNER of the CONTROL-D Printers Control monitor, the online monitor, and each online user. A sample IOA BANNERS library is supplied as part of the IOA installation. The library contains the following banners:

Table 9   Banner Pages (Part 1 of 2)

Banner	Description
XxBNDLST[a]	Bundle Open Banner
XxBNDLENa	Bundle Close Banner
xxUSERSTa	Beginning of a User (Recipient) Reports Banner
xxUSERENa	End of a User (Recipient) Reports Banner
xxREPSTAa	Start of Report Banner
xxREPENDa	End of Report Banner
$$UINDXH	Header of Reports Index
$$UINDXV	Format of each index line

Table 9   Banner Pages (Part 2 of 2)

Banner	Description
$$ONLSTA	Start Banner of immediate print requests
$$ONLEND	End Banner of immediate print requests

a   The type of printer used to print the report (Xerox, APA, Siemens, and so on) determines the prefix of the banner members, as follows:

<u>Type Banner prefix</u>
REG $$
LAS $$
APA $1
XER $2
FOB $3

Types are specified in the CONTROL-D banner exit (member CTDX003 in the IOA SAMPEXIT library).

Printing Banners

Banners (separators) in CONTROL-D are produced at the following times:

- At the start of a bundle (printing mission)
- At the end of a bundle (printing mission)
- At the start of a user bundle
- At the end of a user bundle
- At the start of a report
- At the end of a report

Indexes are also produced as follows:

- At the start of a bundle (printing mission)
- At the start of a user bundle

Figure 37   Banner Index Production
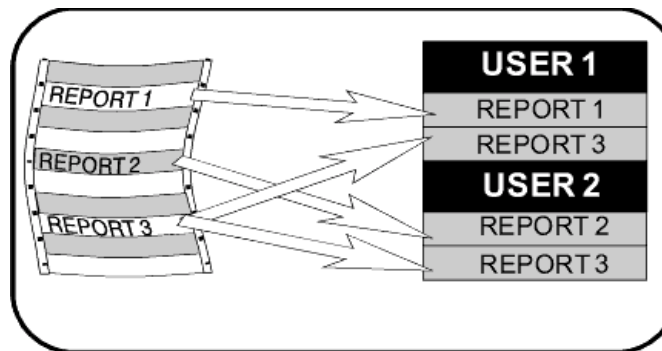
All of these banners and indexes are optional. Each CONTROL-D user can specify which of the banner types is required and only those banner types and indexes are produced. For more information on specifying required banner types, see the CONTROL-D and CONTROL-V chapter of the *INCONTROL for z/OS Administrator Guide.*

The required banner types can also be specified on the user (recipient) level in the Recipient Definition screen.

The CONTROL-D banners are produced from banner skeletons. These banner skeletons reside in a standard PDS library, the IOA BANNERS library. Each banner type resides in a standard PDS member. Banners can be modified to meet each user's requirements by simply editing the banner skeleton members. There are many banner variables that can be used within banners, such as recipient name, report name, job name, date, and so on.

AFP commands (structured fields) can be specified in CONTROL-D banner skeletons. Banner skeletons can even be defined as full AFPDS (page mode). This enables the data center to take full advantage of any AFP capability with CONTROL-D banners. The following sections describe several options for CONTROL-D banners printed on AFP printers.

Using the OUTPARM Option for Banners

By default, banners are printed with the same printing characteristics as the report that follows them. In many cases, banners with printing characteristics that differ from the report that follows need to be printed differently. Otherwise, if a report prints with an overlay, the banner also prints with an overlay. If a report is printed 2-up or 4-up, the banner also prints 2-up or 4-up. In certain cases, the banners need to be printed with special printing characteristics; for example, print all banner pages on blue paper (from the alternative printer bin) for page marking on cut sheet printers.

The OUTPARM option enables you to print banners with printing characteristics that are different from those of the following report. (Banners can also be printed with different printing characteristics by using the CONTROL-D banner user exit CTDX003, but the OUTPARM option is much easier to implement and more flexible.)

During the CONTROL-D installation process, you must specify that the OUTPARM option is going to be used. For instructions on activating the OUTPARM option, see the CONTROL-D and CONTROL-V chapter in the *INCONTROL for z/OS Administrator Guide*. Note that the CTDUX003 installation parameter BANNER must be set to NO. This indicates that the banners will not print with the same printing characteristics as the reports.

Defining the $$BANCHR Member

A special member called $$BANCHR is created in the OUTPARMS library. When the $$BANCHR member is present and the OUTPARM option is installed, CONTROL-D searches this member for banner printing characteristics. The contents of the $$BANCHR member are very similar to the contents of other OUTPARM members.

The main difference is that the +++ lines refer to a printing mission name or mask and not to a report name. The line or lines that follow the +++ line contain the desired printing characteristics for the banners. All of the printing characteristics listed in Chapter 8, "The OUTPARM Option," can also be used for banners.

OUTPARMS for Immediate Print Banners

The OUTPARM option can also be used for assigning printing characteristics to immediate print banners. This is achieved by specifying $$ONLINE on the +++ line followed by the printing characteristics line or lines.

$$BANCHR Example

```
+++STD
CHAR1=GS10
CHAR2=BRCD
+++$$ONLINE
CHARS=GS12
+++*
OUTPUT=BANNER
```

In the above example, the banners for printing mission STD print with special font printing characteristics (for TRC purposes). Immediate print banners are printed with the GS12 font. All other printing mission banners are printed with the printing characteristics defined in the BANNER OUTPUT statement.

Marking User Bundles

In data centers that do not have job separator machines, all printed (centralized printing) user bundles are separated manually. Page marking becomes an important issue in this manual process, so that it is easy to differentiate between user bundles.

Figure 38   Several User Bundles Separated By Page Markers

Page marking for user bundles is performed differently from one printer type to the next. AFP page printers can be separated into two main categories:

■ Cut sheet printers (for example, 3812, 3816, 3820, and so on)
■ Continuous forms printers (for example, 3800-3, 3835, 3900, and so on)

Cut Sheet Printers

The following topics are covered in this section:

■ Using Special Stationery
■ Printing on the Page Perforation
■ Using a Special FORMDEF (With Electronic Overlay)
■ Using a CTX/PTX Structured Field

Using Special Stationery

Most AFP cut sheet printers have two bins. One is the primary bin, and the other is the alternate bin. The primary bin is used for the paper (usually plain white) required to print reports. The alternate bin is used for special stationery, different from that in the primary bin (for example, blue paper, or a larger size stationery than the stationery in the primary bin). The Bundle Start/End banners and the User Start/End banners must be instructed to print using the alternate bin. In this way, it is simple to differentiate between the bundles. A special FORMDEF is required for the banners to print using the alternate bin. To assign banners to print using the special FORMDEF, see "Using the OUTPARM Option for Banners" on page 76.

The special FORMDEF must consist of two Copy Groups. One Copy Group must be defined to print from the primary bin for Report Start/End banners. The other Copy Group must be defined to print from the alternate bin for Bundle Start/End banners and User Start/End banners. Following is an example of how to define such a FORMDEF using PPFA (Page Printer Formatting Aid – an IBM product for defining PAGEDEFs and FORMDEFs).

```
FORMDEF      BANNER
    REPLACE  YES ;
COPYGROUP    PAGEB1
    BIN      1 ;
    SUBGROUP COPIES 1 ;
COPYGROUP    PAGEB2
    BIN      2 ;
    SUBGROUP COPIES 1 ;
```

In the above PPFA definition example, the FORMDEF name is BANNER. The Copy Group name PAGEB1 is printed using the primary bin (Bin 1). The Copy Group name PAGEB2 is printed using the alternate bin (Bin 2).

This method of page marking (using special stationery) is the recommended method for AFP cut sheet printers. This method cannot be used for continuous forms printers.

Printing on the Page Perforation

On cut sheet printers, in addition to the previously described method, there are two additional alternatives for initiating page markers:

- Using a special electronic overlay
- Using a CTX/PTX in the banner

Using a Special FORMDEF (With Electronic Overlay)

Page markers can be initiated using a special electronic overlay for the user banner pages. The overlay can be initiated either using the IPO structured field (PSF Release 2 and above) or by using a special FORMDEF for printing banners. The overlay prints a box on the edge of the page. The overlay can be created using OGL (Overlay Generation Language) - an IBM product for creating electronic overlays. A similar method is used for the default job separators when first installing PSF for non-CONTROL-D printing.

When using a special FORMDEF, this same FORMDEF is used for all banners. For this reason, we recommend defining this FORMDEF with two Copy Groups. Use one Copy Group for all banners except the User Start Banner, and a second Copy Group for the User Start Banners. Make the first (default) Copy Group the Copy Group for all banners except the User Start Banner.

Using a CTX/PTX Structured Field

A simple method of initiating page markers is by inserting an AFP Structured Field to initiate a box or a thick line on the edge of the User Banner pages. Following is an example of the CTX/PTX for printing a thick line. This CTX/PTX can be added to the User Banner (in the IOA BANNERS library) and placed wherever required (in the first column).

```
X' 5A0015D3EE9B0000002BD304C7000007E40A80000600'
```

The remaining part of the line must be padded with blanks (X'40').

Continuous Forms Printers

There are two types of AFP continuous forms printers:

- 3800-X (excluding the 3800-1, that does not support AFP).
- All the other AFP continuous forms printers (for example, 3900, 3835, and so on).

The 3800 printers cannot print on the page perforation. This is a hardware limitation. The only way to initiate a page mark on the page perforation is using PSF services. A sample PSF exit (PSF Exit 4) that initiates a box on the perforation of the page is supplied with CONTROL-D. By specifying a special string within a banner, the box does or does not appear. In general, all pages of one user bundle are printed with the

box appearing on the page perforation, and all pages of the next user bundle are printed without the box on the page perforation. In this way, it is easy to differentiate between user bundles. For a detailed description of how to use this option, refer to member DOCDPAGM in the IOA DOC library.

For all continuous forms printers that support MFCS, this is the recommended method. All other AFP continuous forms printers can use the same method as the cut sheet printers (but not the special stationary method). AFP printers (except the 3800) do not have the limitation of printing on the page perforation. As a result, most of the methods described for cut sheet printers can also be used for these printers.

When choosing to print the page mark on the page perforation, especially for continuous forms printers, JES must be prevented from printing the regular JES page marking. It is confusing to have two different types of page marking on one bundle. To achieve the suppression of the regular JES page marking, a standard JES operator command to the printer can be used. Following is an example of the JES2 printer operator command that is required to suppress JES2 page marking:

```
$T PRTnnnn, MARK=NO, COPYMARK=CONSTANT, $=N, $EPDS=N
```

The following JES3 printer operator command suppresses JES3 page marking (applies to the ESA version of JES3 and all subsequent releases):

```
*S devname, MK=N, COPYMARK=N ("*" is the JES3 command prefix)
```

Steps for Preparing a Page Marker

To make page marking only for a specific banner (for example, the user Start/End banner), you must perform the following steps:

1 Define a logical overlay using OGL Language. The overlay must contain the specific shape for the page marker.

2 Assume that the overlay name is OVMRK. That name is defined in the OGL definition. You need to define (using PMF or PPFA) a FORMDEF containing the overlay name.

3 Define a FORMDEF (for example, BANFRM) that includes two Copy Groups. The first Copy Group (for example, NOMRK) is the default Copy Group. The second Copy Group (for example, OVMRK) includes the OGL overlay.

4 In the OUTPARMS library, a special member called $$BANCHR must be created (if it does not already exist). For example, suppose the user wants to mark the user banner of a specific printing mission (for example, STD), a mask (for example, PRT*), or all printing missions (for example, *). This example is for all printing missions of that user. In the first column write the following:

```
+++*  (for all printing missions)
OUTPUT=BANUSR
```

5 Add an OUTPUT statement in the CTDPRINT, named BANUSR (as specified in the $$BANCHR). This OUTPUT statement must include the FORMDEF parameter that was defined previously as BANFRM. The OUTPUT statement card name can be any name you choose, as long as the name is equivalent in the OUTPUT parameter and in the CTDPRINT procedure.

6 If the page marking appears on the beginning of the user banner ($$USERST – banner page member) or the end of the user banner ($$USEREN – banner page member), you must add an IMM AFP structure field command to the appropriate member. This command enables you to change the current active Copy Group. In other words, write from the first column the IMM structure field AFP command (in hex code) in the banner member that you want the overlay (page marker) to appear (the last 8 bytes represent the Copy Group name with the overlay):

```
x' 5A0010D3ABCC000002D6E5D4D9D2404040'
```

More information about the different types of banner page members can be found in the CONTROL-D and CONTROL-V chapter of the *INCONTROL for z/OS Administrator Guide*. The members are located in the library allocated to DD statement DABANNER of CTDPRINT.

7 Check if the DD statement named DAOUTPUT exists in the CTDPRINT procedure and that the OUTPARMS library is allocated to that statement.

8 Check if the correct value was assigned to the parameters in the CTDX003. For additional information refer to the *INCONTROL for z/OS Administrator Guide*. The value of the BANNER parameter must be NO. The OUTPARM parameter value is determined by the way you work with the OUTPARMS library. The CONTROL-D OUTPARMS library is used with this option. Each member in this library refers to a job name (for example, the member name is the job name), or each member refers to a user id (for example, the member name is the recipient name). Please note that all member names must refer either to job names or to user ids – the two cannot be mixed. Either way, the OUTPARM parameter must be specified with one of these values.

9 Do not set the CHUNKSIZE parameter to 0 in conjunction with the use of OUTPARM in banner pages. This can cause the banner and the report to be printed with the same characteristics (for example, same FORMDEF).

10 Now all banners, other than the user banner, are printed according to the default without any page marking (with the first Copy Group NOMRK). Then when a user banner, that must have a different page marking, is about to print, the IMM AFP command changes the Copy Group to that specific banner only.

Bar Codes in Banners

CONTROL-D is capable of printing bar codes on banner pages. The bar codes are usually used by additional hardware components, such as job separator machines or shrink packaging machines.

Any data, whether banner variables or any other user supplied data, can print in bar code format. Bar codes are usually required on the Start-User bundle banner (member $$USERST in the IOA BANNERS library) so the explanations and examples below use this banner. Note that bar codes can be printed on any or all CONTROL-D banners, not only on the user bundle banner.

AFP provides three basic methods for printing bar codes:

■ BCOCA – This method can be used on printers that support IBM's Bar Code Object architecture. Using AFPDS X'5A' bar code records, the required bar code can be printed. This method requires special software and is only supported on specific AFP printers. For additional information regarding AFPDS bar code records, refer to the IBM publication *AFP Data Stream Reference S544-3202*.

■ DRAWRULE Commands – Using regular AFPDS X'5A' DRAWRULE commands, the required bar code can be printed. This method requires drawing the bar codes manually, not a simple task. When using variable data (such as a recipient name), this task becomes even more difficult.

■ Bar Code Fonts – IBM offers a set of special bar code fonts; each bar code font is intended for a specific purpose. This method is the simplest and most commonly used on AFP printers. The bar code font method is supported on all AFP supported printers. It also provides a simple method for printing variable data in bar code (an IBM conversion routine). This is the recommended method for printing bar codes on CONTROL-D banners. For additional information regarding IBM AFP bar code fonts, refer to the IBM publication *Bar Code Fonts User's Guide S544-3190*.

Many possible techniques exist for printing bar codes on CONTROL-D banners. The general concept is to decide which data need to be printed in bar code format and to print those data using a bar code font. For example, if the recipient (user) name needs to be printed in bar code format, the CONTROL-D banner variable %USER% must be used for retrieving the recipient name and placing the recipient name in position (that

is, line and column) on the banner page where the bar code is required. This line is then assigned to print with a bar code font (character set). Following is a description of possible techniques for assigning this line (or just the recipient name) to print with a bar code font.

Using CTX/PTX for Printing Bar Codes

This technique is based on the use of CTX/PTX (Composed Text / Presentation Text) structured fields. This technique is very similar to the TRC technique. The main difference is that a special second column is not required in the user banner for selecting the special bar code font. Using this technique it is also possible to limit the bar code font to text in a specific range (columns) on a line. This makes it simple to print other text on the same line that is not in bar code.

The list of fonts can appear (as with the TRC technique) in the CHARS parameter, or in parameters CHAR1, CHAR2, and so on, using the OUTPARM option or in the Font List of the active PAGEDEF used when printing the banner.

The CHARS parameter or the PAGEDEF parameter (if not specified in the $$BANCHR member) must be added with the desired value in an OUTPUT statement in CTDPRINT. There is no need to indicate the TRC printing parameter. When using the OUTPARM option, the CHARS parameter can be added in the $$BANCHR member, so that an OUTPUT statement is not required in CTDPRINT.

Note that when using the CHARS parameter (or parameters CHAR1, CHAR2, and so on), up to four fonts can be specified. When using a PAGEDEF, as many as 127 fonts can be specified. Normally, up to four fonts are sufficient.

If you selected the method that does not require an OUTPUT statement, skip to "Adding the CTX/PTX to the Banner Member" later in this chapter.

If there is a need to inform CONTROL-D that banners must print using a special OUTPUT statement, one of the following methods can be used:

- Use the OUTPARM option.
- Perform a modification to the CONTROL-D Banner Exit CTDUX003.

The following is an example of the OUTPUT statement that must be added to CTDPRINT and referred to from the OUTPARM option or from exit CTDUX003.

```
       .
       .
       .
//BANNER   OUTPUT   CHARS=(GT12, BRCD)
    .
    .
    .
```

In the above example, font GT12 is the data center's default font and font BRCD is the special bar code font.

Following is an example of the OUTPUT statement that must be added to CTDPRINT and referred to from the OUTPARM option when using a PAGEDEF. Note that it is also possible to specify the PAGEDEF in the OUTPARM option.

```
       .
       .
       .
//BANNER   OUTPUT   PAGEDEF=BNRCD
    .
    .
    .
```

In the above example, PAGEDEF BNRCD is the special PAGEDEF that contains the required Font List.

Adding the CTX/PTX to the Banner Member

The user banner (member $$USERST in the IOA BANNERS library) must be updated with the CTX/PTX instruction on the line on which the bar code is to be printed. Then the banner variable %USER% must be added on the same line. If any additional data are required in print in bar code format, it can be added in the banner.

Following is an example of the CTX/PTX line that must be added to the user banner. Notice that it is in Hex format.

```
X' 5A002CD3EE9B0000012BD303F10216DA'
```

where

```
00 2C           Length of the record.
D3 EE 9B        Structured field identifier (CTX/PTX).
2B D3 03 f1 02 Set the font identifier (for example, 02).
16              Length of the followed data (for example,
                recipient name).
```

The data (for example, %USER%) must start after X'DA' in regular character format.

Using TRC for Printing Bar Codes

This technique is based on the Table Reference Characters (TRC) option. This option allows printing of output, using different fonts for each line of output data. The font to be used to print a specific line is specified in the second column of each line of output data – in our case, the second column of the user banner. If 0 is specified, the first font in the associated Font List is used to print this line. If 1 is specified, the second font in the Font List is used to print this line. If a blank is specified, then the first font is used (the default font). In our case, the first font is the regular default font used in the data center (required for regular text in the banner). The second font is the special bar code font. A complete description of this option appears in section "Specifying Fonts Using the CHARS Parameter" of the *IBM 3800 Programmers Guide (SH35-0061).*

The Font List can be specified as follows:

- Using the CHARS parameter with up to four fonts listed.
- Using parameters CHAR1, CHAR2, and so on, in the OUTPARM option.

Using a special PAGEDEF containing a Font List (with the TRCREF command of PPFA).

When using the CHARS parameter, the Font List with the desired font names must be added to an OUTPUT statement in the CTDPRINT procedure.

When using parameters CHAR1, CHAR2, and so on, in the OUTPARM option, the Font List with the desired font names must be specified in the $$BANCHR member in the OUTPARMS library.

When using a special PAGEDEF, the PAGEDEF name must be specified in member $$BANCHR in the OUTPARMS library. It is also possible to specify an OUTPUT statement name in member $$BANCHR and specify the PAGEDEF name in the OUTPUT statement in CTDPRINT. That way, one of the OUTPUT statements in the CTDPRINT procedure specifies the printing characteristics of the banner.

In addition to the Font List, an indication that the banners are required to be printed using the TRC option must be added to the OUTPUT statement.

CONTROL-D must be informed that banners are to be printed using a special OUTPUT statement. This can be accomplished by:

■ Using the OUTPARM option. This is the recommended method.
■ Performing a modification to the CONTROL-D banner exit CTDUX003. Although this method requires a minor local modification, remember that the previous method is more dynamic.

Following is an example of the OUTPUT statement that must be added to CTDPRINT and referenced from the OUTPARM option or from exit CTDUX003.

```
.
.
.
//BANNER   OUTPUT   TRC=YES, CHARS=(GT12, BRCD)
.
.
.
```

In this example, font GT12 is the default font and font BRCD is the special bar code font. Setting TRC to YES is the same as setting OPTCD to J in the DD DCB parameter.

The user banner (member $$USERST in the IOA BANNERS library) must be updated with the TRC indication in the second column of the line that is required to print the bar code. Then the banner variable %USER% must be added on the same line. If any additional data need to be printed in bar code format, they can be added in the banner.

Recommended Technique for Printing Bar Codes

The recommended technique for printing bar codes in banners is the CTX/PTX technique. This is the simplest to implement. It is also recommended that you use the OUTPARM option, so that an OUTPUT statement is not required in CTDPRINT.

Using Large Fonts in Banners

The method described above for printing bar codes can be used for printing specific information in a banner with a large font. Any data, whether banner variables or any other user supplied data, can be printed using large fonts. Large fonts can be printed on any or all CONTROL-D banners. Most of the large fonts are IBM licensed fonts and must be specially ordered from IBM/Pennant. More information about large fonts can be found in the *ABOUT TYPE: IBM's Technical Reference for 240-Pel Digitized Type (SH544-3516)*.

12

Archiving and Restoring AFP Reports

For all AFP reports that are archived by CONTROL-D, the reports' printing characteristics are maintained, including their AFP printing characteristics. The printing characteristics are maintained in the CONTROL-D archived reports database (that is, History User Report list).

The printing characteristics can be displayed (and modified if required) online, using the CONTROL-D Online facility.

Disaster Recovery (Backup Site) for Printers

There are two situations where a backup site for printing is essential.

■ In data centers with only one or a few AFP printers (main printer). For example, situations when the printer is out of order in the middle of the night during end-of-month processing can and do occur.

■ Data centers that have peak periods but normally print lower amounts of output may prefer to do some of their peak day printing at another site. This method avoids the need to purchase more printers that are used only on peak days.

Without AFP, in order to print at a backup site, a copy of the SYS1.IMAGELIB dataset had to exist at the backup site. However, only one SYS1.IMAGELIB dataset is allowed per CPU and each CPU must have a SYS1.IMAGELIB dataset. The backup site also has a SYS1.IMAGELIB of its own. If even one definition (for example, font shape) is not identical for both sites, then the backup site cannot be used for printing. What generally occurred to avoid this restriction was that the resident SYS1.IMAGELIB dataset was temporarily replaced, which was inconvenient and less than productive.

AFP, however, does not require the use of SYS1.IMAGELIB. AFP printing characteristics can be defined in any number of libraries on a single system. In addition, different libraries can be defined to different printers, using the same PSF procedure. A copy of the AFP libraries is all that is required at the backup site.

Using the JES OFFLOAD facility, CONTROL-D bundles can be downloaded to tape or cartridge retaining all printing characteristics and the correct sequence of the bundle. Reports can be printed on a backup site printer, regardless of whether or not CONTROL-D is installed at the backup site.

Preparing for Backup Site Printing

There are two locations at which preparations for backup site printing must be made:

- The data center
- The backup site data center

Preparations in the Data Center

- A special document of instructions must be prepared for the operators who perform the backup site printing. The document must include all of the steps that they must perform.

- A number of OFFLOADers can be defined to JES. It is most convenient to have one of the OFFLOADers already defined with all the required parameters. For a detailed description of the required OFFLOAD parameters, refer to the *JES Operator's Guide*.

- Special consideration for the OFFLOAD selection criteria parameters must be taken depending on the chunking method used. This is to ensure that only CONTROL-D bundles are transmitted to the OFFLOAD facility.

  — If not using the chunking mechanism, that is, if CHUNKSIZE is set to 0, the CONTROL-D Printing monitor name (that is, CTDPRINT) must be specified as the job name that OFFLOAD must select from spool. The following command demonstrates how this may be specified to the OFFLOADer:

  ```
  $TOFFx, JOB=CTDPRINT, WS=(JOB)
  ```

  Note that the WS (Work Selection Criteria) parameter must also be updated. The x must be replaced with the OFFLOADer identification number.

  — If using the chunking mechanism, that is, if the value of CHUNKSIZE is greater than one, the logical printer destination (for example, U1001, as specified in CTDPARM) must be used as the destination selection criteria. The following command demonstrates how this may be specified to the OFFLOADer:

  ```
  $TOFFx, R=U1001, WS=(R)
  ```

  Note that the WS (Work Selection Criteria) parameter must also be updated. The x must be replaced with the OFFLOADer identification number.

- The AFP external printing characteristics must be available at the printing backup site data center. This can be made available in one of a number of ways:

  — Adding an additional step to the printing backup site procedure and copying the AFP external printing characteristics libraries onto tape or cartridge while transmitting the bundles to the OFFLOAD facility. Using a simple IEBCOPY utility (or equivalent) is sufficient.

  — Having a copy of the AFP external printing characteristics at the printing backup site data center at all times (that is, prepared in advance). This way, there is no need to copy the external printing characteristics libraries to the printing backup site data center while in the transmitting process.

- No special preparations need to be performed in CONTROL-D.

Preparations in the Backup Site Data Center

- As with the OFFLOAD preparations at your data center, there must be an OFFLOADer prepared at the printing backup site, ready to be used with all relevant OFFLOAD parameters.

- The printer at the printing backup site usually needs to be dedicated to the bundles. To achieve this, the same guidelines used to transmit only CONTROL-D bundles to the OFFLOAD facility at your site can be used in order to print only your particular bundles at the backup site printer.

  — If not using the chunking mechanism, that is, if CHUNKSIZE is set to 0, the CONTROL-D Printing monitor name (that is, CTDPRINT) must be specified as the job name the printer selects from spool. The following command demonstrates how this may be specified to the printer:

  ```
  $TPRTx, JOB=CTDPRINT, WS=(JOB)
  ```

  Note that the WS (Work Selection Criteria) parameter must also be updated. The x must be replaced with the printer identification number.

  — If using the chunking mechanism (that is, CHUNKSIZE greater than one), the logical printer destination (for example, U1001, as specified in CTDPARM) must be used as the destination selection criteria. The following command demonstrates how this may be specified to the printer:

  ```
  $TPRTx, R=U1001, WS=(R)
  ```

  Note that the WS (Work Selection Criteria) parameter must also be updated. The x must be replaced with the printer identification number.

- Prepare a PSF procedure that has your AFP external resource libraries concatenated.

- Note that the printing backup site does not have to have CONTROL-D installed. At the printing backup site, the printing process is totally independent of CONTROL-D and uses JES facilities only.

Disaster Recovery Flow

Once the above preparations for the backup site printing have been made, you are ready for printing at the backup site. Hopefully a disaster will not occur, but if it does, the following procedure must be performed:

In Your Data Center

- Start the OFFLOAD facility using the appropriate JES DEVICE operator command.

- Trigger the CONTROL-D printing mission.

- If the AFP external printing characteristics resources are not prepared in advance at the printing backup site, copy the resources to tape or cartridge.

Wait for the printing mission to finish and wait for all chunks on spool to be transmitted to the OFFLOAD facility. Then close the OFFLOAD facility using the appropriate JES operator command.

At the Printing Backup Site Data Center

- If the AFP external printing characteristics resources were not prepared in advance at the printing backup site, copy the resources to DASD at the printing backup site.

- Start the printer using the special PSF procedure that has your AFP external printing characteristics resource libraries concatenated.

- Start the OFFLOAD in order to receive your bundles to the printing backup site's spool.

- Issue the relevant JES commands to the printer (as described above in preparations at the printing backup site).

■ When all printing is finished, close the printer. The OFFLOAD facility automatically closes itself once all bundles are received on the printing backup site's spool.

Printing Backup Site Summary

As described above, a number of tasks must be performed in advance in order to implement the disaster recovery (backup site) for printers, but it is well worth the effort. Large savings may very well be realized for those sites that implement this option.

Performance Considerations

For each AFP printer, the manufacturer specifies the maximum number of pages (or impressions) per minute that the printer is capable of printing. Use this number as a "model" when investigating how many pages per minute are actually printed. The variety of printing characteristics and the complexity of the output has a significant influence on printer performance. In many cases, the printer's speed is significantly less than its maximum rated speed.

When using CONTROL-D, there are a number of guidelines that may help in improving AFP printer performance. Not all AFP users experience problems with printer performance, but those users who do should read this chapter.

In-Line Resources

CONTROL-D in-line resources can improve PSF performance. The performance improvement depends on the variety of PAGEDEFs and FORMDEFs that are used by your data center's output. PSF holds in its memory up to seven copies of the most previously used PAGEDEFs and up to seven copies of the most recently used FORMDEFs. PAGEDEFs and FORMDEFs are used only by PSF and are not loaded to the printer. PAGEDEFs and FORMDEFs are instructions to PSF on how to format the output. PSF formats the output and sends it to the printer formatted, using IPDS (Intelligent Printer Data Stream). IPDS is the data stream that is used by PSF to communicate with the printer. It is a two way communication. Fonts, overlays and Page Segments (images) are downloaded to the printer. The more resident fonts, the better the performance. Page Segments can be included in an output by an overlay or by specifying an IPS structured field. When using the IPS structured field, you can optionally specify the Page Segment in the Page Segment list of the PAGEDEF. This is the suggested method for performance reasons, but it is not a requirement.

Using the CONTROL-D in-line resource option, printer performance may be improved when using more than seven PAGEDEFs or seven FORMDEFs. This is because CONTROL-D relieves PSF from reading the PAGEDEFs and the FORMDEFs from an external library at the time when the output is already selected to print from spool. CONTROL-D reads the PAGEDEFs and the FORMDEFs from the external libraries in advance, immediately before sending the output to spool.

Using a Global PAGEDEF and FORMDEF

In data centers that use a relatively small variety of PAGEDEFs and FORMDEFs, one global PAGEDEF and one global FORMDEF are defined. The general idea is to define all original PAGEDEFs in one global PAGEDEF, each as Page Formats in the global PAGEDEF. The same can be done for a global FORMDEF. Define all original FORMDEFs in one global FORMDEF, each as Copy Groups in the global FORMDEF. The main advantage of this method is improved printer performance.

The APAPARM option must be used for correct selection of the required Page Format and/or Copy Group. For a detailed description of this option, refer to Chapter 6, "The APAPARM Option."

The specific Page Format and Copy Group to be used for each report are specified in the APAPARM library. The Page Format and Copy Group names appear in the PAGEDEF and FORMDEF. If the name is not known, it can easily be displayed by browsing the PAGEDEF or FORMDEF member in the system or user PAGEDEF/FORMDEF library. For PAGEDEFs, the line that displays the Page Format name (in Hex) is the BDM command X'D3A8CA' (Begin Data Map). For FORMDEFs, the line that displays the Copy Group name (in Hex) is the BMM command X'D3A8CC' (Begin Medium Map). The name itself appears in regular text format on the same line.

IBM supplied PAGEDEFs usually contain a Page Format with the same (or close to the same) name as the PAGEDEF, as do IBM supplied FORMDEFs and Copy Groups. User-defined PAGEDEFs and FORMDEFs usually use the same standard as IBM. For user-defined PAGEDEFs where the original PAGEDEF has more than one Page Format, or for user-defined FORMDEFs where the original FORMDEF has more than one Copy Group, use a logical name for the Page Format/Copy Group. For example, if the original PAGEDEF was named P1STATEM, then you could name the Page Formats as follows: STATEM1, STATEM2, and so on.

Resident Fonts

With printers that support resident fonts, try to have as many commonly used fonts resident on the printer as possible. This can dramatically improve printer performance. Fonts can be loaded as resident fonts on various AFP printers using the PSF APSRMARK utility. For a detailed description of the APSRMARK utility, refer to the *PSF System Programmers Guide.*

Four-Font Data Centers

When using up to four fonts, consider using the following:

CHARS=(*chars1,chars2,chars3,chars4*)

Each output is specified with the font used as the first font in the list of four fonts. This way all four most commonly used fonts are always loaded on the printer, improving performance.

Small Reports and Small Chunks

When printing many small reports using a large variety of PAGEDEFs, FORMDEFs, Fonts, Page Segments and Overlays, do not expect the same printer speed as when printing a large report with a small variety of printing characteristics. Take advantage of the sorting options in the CONTROL-D printing missions. For example, sort by CHARS (fonts) when applicable. This can speed up printing in many situations.

Page Segments

When using the IPS structured field to include a Page Segment, it is best to specify the Page Segment in the Page Segment list of the active PAGEDEF. This improves performance during printing.

Special 3800 Considerations

The 3800 AFP Laser Printer has almost the same technical capabilities as other AFP printers. It is important, however, to be aware of certain differences that can be very significant to some data centers.

The most significant difference is the size of the printer storage. The size of the printer storage determines how many external resources can be stored in the printer at a given time and the capability of the printer to print complex output. The standard printer storage for the 3800 Model 3 printer is up to 512 K. You can purchase a special feature called "3800 Storage Expansion Feature" to expand the storage. Using this feature, the printer storage can reach 4 MB. There is an additional feature called "3800 Accumulator" that can also improve printer performance. Although it is possible to expand the printer storage, most data centers that have the 3800 Model 3 do not have these features.

Therefore, when printing AFP output using the 3800 Laser Printer, try and keep the output simple (not complex) and use a smaller variety of external resources.

Remote Print Manager (RPM)

Remote Print Manager (RPM) stores all fonts, Overlays and Page Segments on a PS/2 that is connected directly to the remote channel attached printer. This means that the transmitting of output to an RPM printer includes almost only the data. This is extremely good for performance. This, in conjunction with in-line PAGEDEFs and FORMDEFs on the mainframe for PSF, provides the best combination for remote printing. Not all AFP printers are supported by RPM. See the relevant IBM publications for additional information about RPM and which AFP printers are supported.

PSF/2 replaces RPM. For information about PSF/2, see Chapter 15, "PC/LAN Environment."

PC/LAN Environment

The following topics are covered in this chapter:

- CONTROL-D/WebAccess Server Product
- PSF/2 Considerations

CONTROL-D/WebAccess Server Product

The following topics are covered in this section:

- Why CONTROL-D/WebAccess Server
- Flow of Events
- Control and Tracking
- Printing Reports

Why CONTROL-D/WebAccess Server

CONTROL-D/WebAccess Server is a software product that enables you to view and manage mainframe reports on the PC and frees you from having to print many reports. It is based on the User Reports (Online Viewing) facility of the mainframe CONTROL-D Output Management System.

Mainframe CONTROL-D was developed to automate and improve the manual report distribution process. Mainframe CONTROL-D performs decollation and then prepares the desired reports for transfer to the PC.

CONTROL-D/WebAccess Server was designated to work in conjunction with mainframe CONTROL-D to enable automatic transfer of mainframe reports to the PC or to a LAN.

Report recipients may then view, edit and print their mainframe reports in a format designed to their specifications on the PC. This frees up costly mainframe resources, increases report availability, and provides report accessibility to the large pool of PC users.

Flow of Events

First, reports are decollated by mainframe CONTROL-D and designated for use by specific recipients. Each recipient's report destination is determined by mainframe CONTROL-D.

Next, a printing mission is activated on the mainframe CONTROL-D that automatically distributes reports with a destination of CTDPC or CTDPCPRT to the PCs.

The printing mission distribution process bundles reports belonging to a specific PC recipient in a special compressed file called a packet. To facilitate control and tracking of packet destinations, a control record is added to the Active Transfer file (ATF) for each packet created by mainframe CONTROL-D. Packets are then ready for transfer to the PC.

CONTROL-D/WebAccess Server initiates the request to transfer reports and then automatically performs the following sequence of events:

■ Accesses the ATF in order to determine which packets are awaiting transfer to the PC user who issued the request.

■ Activates the site's File Transfer program and transfers relevant packets to the PC.

■ "Unbundles" the packets into individual reports and makes the transferred reports available for viewing, editing, and printing on the PC.

■ Sends confirmation to mainframe CONTROL-D that transfer was successful.

■ Retains reports on the PC for the duration specified in mainframe CONTROL-D and automatically deletes expired reports from the PC to free valuable disk space.

Control and Tracking

Central and efficient control is essential to coordinating and administering the distribution of reports to hundreds of PCs. The major aspects of control and tracking are maintained in mainframe CONTROL-D by utilizing the recipient tree and the ATF.

The mainframe CONTROL-D recipient tree defines the hierarchical recipient structure and also controls the following aspects of the CONTROL-D/WebAccess Server recipient base:

■ Which recipients are authorized to receive and process mainframe reports on the PC using CONTROL-D/WebAccess Server.

■ How long the reports reside on the PC – preventing accumulation of outdated reports and maintaining control of PC disk space.

■ When reports may be downloaded from the mainframe to the PC – maintaining control of the load on the mainframe resources and PC-mainframe communication lines.

■ Where reports reside on the PC – allowing the CONTROL-D administrator to maintain control of data file distribution to PC disks.

■ Size of the reports that may be transferred to the PC.

The Active Transfer file is accessed using the File Transfer Control screen in mainframe CONTROL-D and provides the means to track and control the active packets.

Printing Reports

The major printing functions that can be performed using CONTROL-D/WebAccess Server are listed below:

■ Specify the range of pages to be printed.
■ Specify the format of the report to be printed by specifying the ruler name.
■ Determine the number of copies to be printed.
■ Set the length of the print page.
■ Specify whether to print a banner page (separator) at the beginning and at the end of the report.
■ Specify the destination to which the report is printed.
■ Export a report to other PC software products.
■ Specify print instructions such as condensed print.

PSF/2 Considerations

The IBM Print Services Facility/2 (PSF/2) program provides AFP to the local area network (LAN) workstation environment or stand-alone environment.

PSF/2 provides LAN printing and combinations of printer sharing among LAN users. By extending AFP to the standalone personal computer (PC) and LAN environments, PSF/2 lets you print high quality output on a PS/2 attached printer.

By supporting a wide range of data streams and printers, PSF/2 lets you print to almost any printer in your organization. You can add printers based on their capabilities rather than worrying about matching specific printers with specific applications.

PSF/2 also allows the same level of systems management, resource management, error recovery and reporting currently provided with the host PSF products. Like the host PSF products, PSF/2 provides the fonts needed for the supported printers.

Supported Printers

PSF/2 supports a wide variety of IPDS and HPCL printers. It supports the entire family of IBM's IPDS laser printers. This family includes printers ranging from the 10 page per minute (4028 LaserPrinter) to the 229 page per minute (3900 Printer). The following are IPDS printers supported by PSF/2:

- IBM 3812 Page Printer Model 2
- IBM 3816 Page Printer Model 01D and Model 01S
- IBM 3820 Page Printer, channel attached
- IBM 3820 Page Printer, communication attached
- IBM 3825 Page Printer
- IBM 3827 Page Printer
- IBM 3828 Advanced Function MICR Printer
- IBM 3835 Page Printer and 3835 MICR printer
- IBM 3900 Advanced Function Printer
- IBM 4028 LaserPrinter Model NS1

Control of Printing

PSF/2 provides comprehensive printing control, previously available only through the host PSF products. For the IPDS printers, PSF/2 provides automatic error recovery, ensuring that if a print job is interrupted, the job is restarted from the point of the error. PSF/2 also provides error messages and online Help information to help you resolve problems.

PSF/2 provides interfaces that help the LAN print administrator define and manage printers and resources (for example, the Print Submission interface enables you to quickly and easily submit print jobs).

To help you tailor and manage the system, PSF/2 provides user exits for accounting, security, and job separation.

Index

Symbols

Numerics

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Notes

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